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ENVIRONMENTAL IMPACT STATEMENT
FOR
OKATOMA CREEK WATERSHED

COVINGTON, FORREST, JONES, SIMPSON, AND SMITH COUNTIES, MISSISSIPPI

JUNE 1975

PREPARED BY
UNITED STATES DEPARTMENT OF AGRICULTURE
Soil Conservation Service
Jackson, Mississippi 39205

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Okatoma Creek Watershed, Covington, Forrest, Jones, Simpson, and Smith Counties, Mississippi

ENVIRONMENTAL IMPACT STATEMENT

W. L. Heard, State Conservationist
Soil Conservation Service

Sponsoring Local Organizations

Okatoma Creek Water Management District
Collins, Mississippi 39438

Pat Harrison Waterway District
P. O. Drawer 312
Hattiesburg, Mississippi 39401

Town of Collins
Collins, Mississippi 39438

Covington County Soil and Water Conservation District
Collins, Mississippi 39438

Forrest County Soil and Water Conservation District
Hattiesburg, Mississippi 39401

Jones County Soil and Water Conservation District
Laurel, Mississippi 39440

Simpson County Soil and Water Conservation District
Mendenhall, Mississippi 39114

Smith County Soil and Water Conservation District
Raleigh, Mississippi 39153

June 1975

PREPARED BY

U. S. DEPARTMENT OF AGRICULTURE
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USDA ENVIRONMENTAL IMPACT STATEMENT

Okatoma Creek Watershed Project

Covington, Forrest, Jones, Simpson and Smith Counties

Mississippi

Prepared in Accordance with
Sec. 102 (2)(C) of P.L. 91-190

Summary Sheet

I Final

II Soil Conservation Service

III Administrative

IV The purpose of the project is to solve or reduce the land, water and renewable natural resource problems (erosion, sedimentation, flooding, low income, and lack of recreation facilities) by utilization of conservation land treatment, 14 floodwater retarding structures, a multiple purpose structure for recreation and floodwater retardation, basic recreation facilities, a levee system and 53.7 miles of channel work. The channel work consists of 9.7 miles of Work Type II, 10.2 miles of Work Type III, and 31.9 miles of Work Type IV. About 16.3 miles has intermittent flow and 37.4 miles has perennial flow.

V The installation of the project will reduce gross erosion, reduce long-term sediment deposition and downstream sediment delivery, reduce flooding, increase income, provide additional recreation facilities, create additional lake fishery and waterfowl habitat, and increase public use of area around multiple-purpose and recreation structure. There will be clearing of forest for structural measures and for agricultural production. There will be a reduction in the stream fishery resource and wildlife habitat. There will be air and noise pollution during construction. Agricultural production will be lost or reduced on acres committed to structural measures.

VI Alternatives considered and evaluated are:
(1) establishment of needed land treatment at an accelerated rate
(2) accelerated land treatment, floodwater retarding structures, one multiple purpose structure with associated multiple use storage, and lake and streamside recreation development
(3) land treatment and channel only with associated channel recreation development
(4) land treatment, flood proofing, and converting present agricultural flood plain to uses less susceptible to flood damage

(5) land treatment, urban flood plain zoning with flood insurance, and converting agricultural flood plain areas to uses less susceptible to flood damage

(6) no project

VII Comments have been received from the following federal, state, and local agencies:

U. S. Department of the Army
U. S. Department of Health, Education and Welfare
U. S. Department of the Interior
U. S. Department of Transportation
Environmental Protection Agency
Federal Power Commission
Advisory Council on Historic Preservation
Federal State Programs, Office of the Governor

VIII Draft statement received by CEQ on November 25, 1974.

USDA SOIL CONSERVATION SERVICE

ENVIRONMENTAL IMPACT STATEMENT

for

Okatoma Creek Watershed

Covington, Forrest, Jones, Simpson and Smith Counties, Mississippi

Installation of this project constitutes an administrative action. Federal assistance will be provided under authority of Public Law 83-566, 83rd Congress, 68 Stat. 666, as amended.

SPONSORING LOCAL ORGANIZATIONS

The Sponsoring Local Organizations are: Okatoma Creek Water Management District, Pat Harrison Waterway District, Covington County Soil and Water Conservation District, Forrest County Soil and Water Conservation District, Jones County Soil and Water Conservation District, Simpson County Soil and Water Conservation District, and Smith County Soil and Water Conservation District.

PROJECT OBJECTIVES AND PURPOSES

An initial study made of the watershed area as part of the Pascagoula River Comprehensive Basin Study was discussed by sponsoring local organizations and Soil Conservation Service representatives. After this discussion and a determination of problems and potential solutions, project objectives were formulated. Primary objectives expressed by the sponsors were watershed protection, flood prevention and recreational facility development.

The local sponsors desire to establish a complete soil and water conservation program on the watershed. Some specific objectives were:

1. Establish adequate treatment for erosion control, sediment reduction, and land protection for an additional 25 percent of the watershed during the installation period.

2. Attain sufficient flood reduction and protective measures in main Okatoma flood plain for continued agricultural use and so that tributary streams might have adequate outlets.

3. Improve the recreational opportunities for the people of the watershed area.

The sponsors considered the impacts, both favorable and adverse, in developing the plan for meeting stated and other objectives. The overall

project objective is the conservation, development, and productive use of the watershed's soil, water, renewable natural resources, and related resources in such a way that the residents of the watershed can enjoy:

QUALITY IN THE NATURAL RESOURCE BASE FOR SUSTAINED USE

QUALITY IN THE ENVIRONMENT TO PROVIDE ATTRACTIVE, CONVENIENT, AND SATISFYING PLACES TO LIVE, WORK, AND PLAY

QUALITY IN THE STANDARD OF LIVING BASED ON COMMUNITY IMPROVEMENT AND ADEQUATE INCOME

The sponsors selected and/or modified measures which will help to achieve these objectives and also to minimize adverse impact wherever possible and still carry out the project objectives.

PLANNED PROJECT 1/

Land Treatment: Land treatment measures are considered basic in formulating this watershed project and are essential to its successful functioning. The project provides for technical assistance for accelerating the establishment of land treatment measures throughout the 179,205 acre watershed area. At the end of the eight-year installation period, about 51,359 acres of land will have received adequate treatment as measured by Soil Conservation Service Standards. This is in addition to the lands of the watershed already adequately treated and the additional lands that will be treated after the end of the project installation period. The 51,359 acres to be adequately treated during the installation period will consist of about 10,200 acres of cropland, 30,720 acres of pastureland, 8,800 acres of forest land and 1,639 acres of critically eroding lands. Other areas will receive partial treatment.

Adequate treatment will be accomplished through use of land treatment systems which are adaptable to each of the land treatment units. For example, a land treatment system for a bottom land-cropland unit will consist of the following measures: conservation cropping system, odd area wildlife planting, row arrangement, crop residue management, drainage field ditches and diversions. For upland-cropland, the treatment measures are: conservation cropping system, odd area wildlife plantings, contour farming, crop residue management, terracing and grassed waterways or outlets.

Conservation cropping systems are the growing of crops in combination with needed cultural and management measures and include crop rotations. Contour farming is the farming of sloping cultivated land in such a way that plowing, preparing land, planting, and cultivating are done on the contour. Crop residue management (crop residue use) is the using of plant

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1/ All information and data, except as otherwise noted by reference to source, were collected during watershed planning investigations by the Soil Conservation Service and Forest Service, U. S. Department of Agriculture.

residues to protect cultivated fields during critical erosion periods. A diversion is a constructed watercourse with a supporting ridge on the lower side constructed across the slope so as to keep hill water from running directly down onto bottom land. A drainage field ditch is a graded ditch for collecting excess water within a field. A grassed waterway or outlet is a natural or constructed watercourse or outlet shaped or graded and established in suitable vegetation as needed for the safe disposal of runoff from a field, diversion, terrace or other structure. Row arrangement is the arrangement of crop rows in such a way as to facilitate and control row drainage. A terrace is an earth embankment or ridge and channel constructed across the slope for the orderly removal of water from sloping cultivated lands. Odd area wildlife planting is the planting of vegetation that is suitable for wildlife food and/or cover in odd size areas and corners of fields.

For bottom land-grassland, the treatment measures are: pasture planting, pasture management, brush control, pond construction, fish pond stocking and management, fencing, and drainage field ditches. For upland-grassland, the treatment measures are: pasture planting, pasture management, pond construction, fish pond stocking and management, brush control, and fencing.

Brush control is killing, suppressing, or managing brush by mechanical, chemical, or biological means or by controlled burning on all areas except cropland and woodland. Fish pond stocking and management is developing or improving impounded water to produce fish for domestic use or recreation. Fencing is enclosing or dividing an area of land with a suitable permanent structure that acts as a barrier to livestock, big game, or people. Pasture planting and management is establishing or reestablishing of long-term stands of adapted species of perennial, biennial, or reseeding forage plants and the proper use and treatment of pastureland. A pond is a water impoundment made by constructing a dam or embankment or by excavating a pit or "dugout".

The U. S. Forest Service in cooperation with and through the Mississippi Forestry Commission will furnish the technical assistance necessary to plan and apply the forestry measures.

For forest land, the treatment measures consist of tree planting, thinning, stand improvement, salvage and harvest cutting, wildlife habitat improvement and preservation practices, and multiple use management.

Tree planting is the planting of tree seedlings or cuttings. Thinning is the removal of some of the trees so that the remainder has room for growth. Stand improvement is removal of unmerchantable or unwanted trees, shrubs, and vines so that the remaining trees will contain a higher percentage of merchantable or wanted trees. Salvage and harvest cutting is the cutting of damaged trees and the ready to harvest trees. Wildlife habitat improvement and preservation is the management of the forest or portions of the forest in such a way as to maintain and/or improve the wildlife habitat potential.

The primary goal of the forestry management program is to enhance the watershed needs and objectives. The forest lands will be managed to fulfill timber, wildlife, and recreation needs to the level where such management is compatible with sound watershed management.

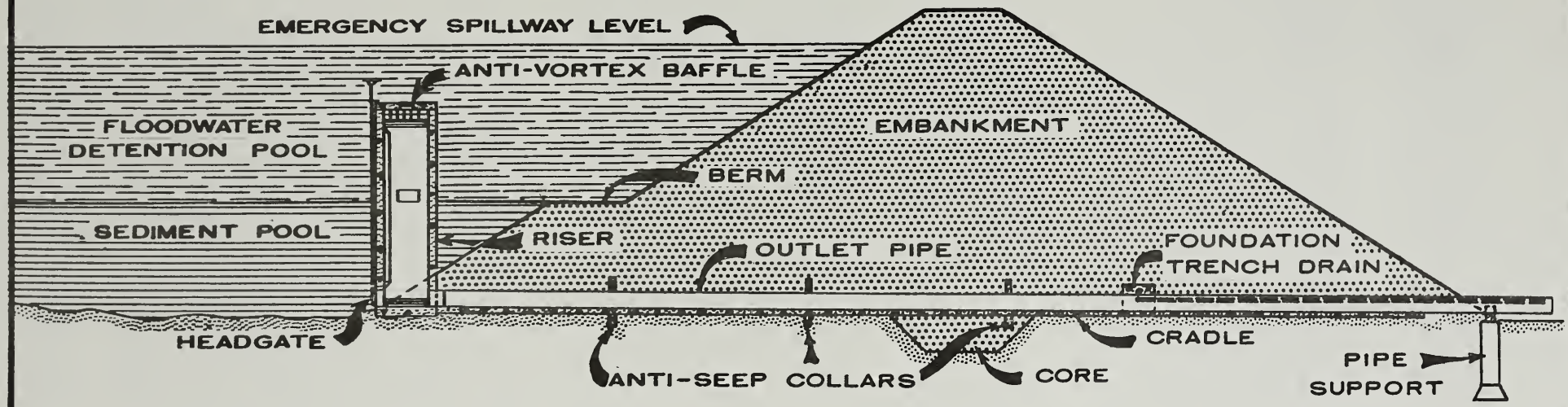
The 1,325 acres of tree planting will be scattered throughout the upland area of the watershed. About 117 acres is critical area planting and will be planted with loblolly pines. Site preparation will consist of brush dams as necessary and the establishment of lovegrass or other drought resistant grasses to hold soils in place until the seedlings are established. The areas will be fertilized, fenced, and protected from fire. The remaining acres are openland plantings and will be planted to loblolly pine. About 260 acres of the openland plantings where there is high grazing risk damage will be fenced. These plantings will be protected from fire to reduce fire damage and so that normal plant succession from openland to forest can take place. It is anticipated that other species such as blackberry vines, green briars, elm, hickory, sweet gum, red oak, and other native species will be present in the resultant stand.

The 100,340 acres of forest land will be treated to improve wildlife habitat conditions by creating small openings in the stands, favoring more desirable mast-producing species of trees and shrubs to provide food as well as cover for existing wildlife.

The critically eroding lands will either be seeded to grasses and legumes or planted to trees. In either case, the site will be prepared for planting, fertilized, mulched where necessary, and growth protected.

Structural Measures: The structural measures included in this watershed work plan consist of floodwater retarding structures, a multiple purpose structure for flood prevention and recreation, channels, a constructed floodway, recreation facilities and a levee system.

Floodwater Retarding Structures. Fourteen floodwater retarding structures are planned for the control of damaging floodwater and sediment as shown on the Project Map, Appendix B. A floodwater retarding structure is a compacted homogenous earth filled dam with provisions for permanent storage of sediment and temporary retardation of runoff water from the drainage area above the structure. All earthen embankments will be vegetated. The structures in this plan are designed for release of water from any of four outlets. Three of these outlets flow into an outlet pipe under the dam. The lowest outlet is a water control slide gate (drain valve) at the elevation of the outlet pipe. See Figure 1 for a typical floodwater retarding structure section. This outlet is a fixed gate that remains closed at all times unless it is necessary or desirable to remove the sediment pool water. Some reasons for this removal are repairs on the dam or outlet pipe, vegetative control in the sediment pool area, and fish or waterfowl management. The next higher elevation outlet is the low stage principal spillway outlet located in the vertical riser that connects to the outlet pipe on the upstream side of the dam. This outlet is at the elevation of the top of the sediment pool. The third outlet, the high stage principal



SECTION OF A TYPICAL FLOODWATER RETARDING STRUCTURE

(TWO STAGE DROP INLET)

Figure 1.

spillway, is the top of the vertical riser which is set at the elevation of the top of the low stage floodwater detention pool. The fourth outlet is the emergency spillway which is at the top of the floodwater detention pool.

The low stage principal spillway outlet, the high stage principal spillway outlet, and the emergency spillway are ungated. The desired flow, for downstream flood protection, from the low stage principal spillway riser is regulated by the size of hole constructed in the vertical riser. The desired flow for downstream flood protection and dewatering from the high stage principal spillway is regulated by the size of outlet pipe or conduit under the dam. The emergency spillway is proportioned by width and distance between its crest and the top of dam so as to bypass water from large or unusual storm events without over-topping or damaging the dam.

The principal spillways will be constructed on yielding foundations. The conduit used will be reinforced concrete. The emergency spillways will be constructed in earth and vegetated. There is ample fill material available at all structure sites with the material to be obtained from the emergency spillway and structure pool areas. Some zoning in the placement of fill material may be required and will be specified during the final design.

The floodwater retarding structures planned will provide 29,760 acre feet of floodwater detention capacity. This is equivalent to 6.12 inches of runoff from their combined drainage area of 91.16 square miles or 1.99 inches of runoff from the entire watershed. They will impound in detention storage from 5.21 to 7.14 inches of runoff from their respective drainage areas which is 32.56 percent of the watershed. The control provided by the principal spillway and retarding storage will vary from a low of 4.0 percent chance to a high of 2.0 percent chance of operation of the emergency spillway. Emergency spillways on seven structures will function between the 2.0 and 2.5 percent chance event, three between 2.5 and 3.0 percent, one between 3.0 and 3.5 percent, and three between 3.5 and 4.0 percent.

The 14 floodwater retarding structures are designed for 100-year sediment storage accumulation. Volume allowances for sediment were made on the basis of 80 percent submerged and 20 percent aerated. Storage volume for the 100-year aerated sediment was made available in the reservoir flood pool areas. Within the area of the floodwater retarding structures, there will be about 1,192 acres of forest land to be cleared. Of this 1,192 acres of forest land, 1,104 acres will be within the sediment pool areas and 88 acres will be at the dams and spillway areas. There will be a total of 1,548 surface acres of water initially impounded within the sediment pools of these 14 floodwater retarding structures. There will be a total of 4,106 acres of lands inundated at the maximum stages with the passage of the design storm through the retarding structures. The dams vary in height from 23.5 to 44.8 feet. Sediment pools range from 26 to 300 acres. The range of surface acres in the temporary flood pools, including the sediment pool, is 61 to 865 acres.

The road and bridge affected by the flood pool of Floodwater Retarding Structure No. 2 will be raised and resurfaced. The road on the east fork

of the stream above Floodwater Retarding Structure No. 5 will be abandoned. The loading chute, shed and barn affected by Floodwater Retarding Structure No. 6 will be moved and the two roads upstream will be abandoned. The road that will be flooded by Floodwater Retarding Structure No. 8 will be abandoned. The road on the north end of Floodwater Retarding Structure No. 12 will be filled and the road at the south end will be filled and a flap gate installed. The two roads above Floodwater Retarding Structure No. 14 will be abandoned. One of the roads above Floodwater Retarding Structure No. 17 will be abandoned, the second will be raised, and the skeet club buildings will be relocated. At Floodwater Retarding Structure No. 18, the road through the dam will be abandoned. The northwest end of the dam for Floodwater Retarding Structure No. 19 will fall very close to archeological site 22-Si-508. However, the archeological report stated that this site was tested to determine the depth of cultural material, was found to have no undisturbed deposits, and is considered expendable.

A water level control device, a vertical sliding gate, will be installed in each of the 14 floodwater retarding structures. These gates will be incorporated into the structure designs which will allow the permanent pool levels to be drawn down from 2 to 3 feet. The gates will also be used to facilitate the planting of millet for waterfowl, to manage fish populations, and to control vegetation. These devices in the floodwater retarding structures will partially mitigate the damages to the stream fishery resource caused by the channel work. This will also make waterfowl management possible in some of the reservoirs.

Low flow augmentation devices will also be installed in all floodwater retarding structures. They will be designed to release 0.2 csm from their respective drainage areas. This release water will come from about mid-depths of the sediment pools due to temperature and BOD considerations. Their functioning will minimize the effect of the structures on the low-flow characteristics of the stream and on water quality.

Multiple Purpose Structures. Multiple Purpose Structure No. 1, a compacted earth filled dam, is planned for the control of damaging floodwater and sediment with additional water storage for recreational purposes. Basic recreational facilities are to be installed for the structure. The structure will provide 3,297 acre feet of floodwater and sediment storage capacity and 1,633 acre feet of storage for recreational purposes.

A water level control device and a low-flow augmentation device will be installed in the multiple purpose structure as further mitigation or compensation for damages to water quality and the stream fishery resource resulting from planned channel work. The water level control device, in addition to those functions previously described for floodwater retarding structures, will serve as a management tool for making replacements or repairs to some of the water based recreation facilities. The floodwater detention capacity of 2,580 acre feet for the multiple purpose structure is the equivalent of 6.64 inches of runoff from its drainage area of 7.29 square miles or 0.17 inches of runoff from the entire watershed. The drainage area of the multiple purpose structure totals 2.60 percent of the watershed. The control provided by the principal spillway and the retarding storage will result in the emergency spillway functioning no more than once in 50 years.

The maximum depth of the sediment pool (100-year submerged) for Structure No. 1 will be 22.0 feet, the depth of the recreation pool above the sediment pool will be 7.2 feet, and the maximum depth of the combined pools will be 29.2 feet.

Within the area of the multiple purpose structure, there will be 266 acres of forest land to be cleared. Two hundred and fifty-nine of these acres will be within the recreation pool and seven acres will be within the dam and emergency spillway area. There will be a total of 275 surface acres within the recreation pool area. The temporary flood pool, including the recreation pool, is 480 acres.

One road affected by the flood pool of Multiple Purpose Structure No. 1 will be filled and resurfaced. The house, barn, and other out-buildings located about 900 feet upstream of the dam will be moved and relocated. Archeological site 22-Qv-501 is located within the proposed recreation pool of Multiple Purpose Structure No. 1. However, the archeological report stated that this site was tested to determine the depth of cultural material, was found to have no undisturbed deposits, and is considered expendable.

The 14 floodwater retarding structures and the multiple purpose structure will provide 32,340 acre-feet of floodwater detention capacity. This is the equivalent of 6.16 inches of runoff from their combined drainage areas of 98.45 square miles or 2.17 inches of runoff from the entire watershed. They will impound in detention storage 5.21 to 7.14 inches of runoff from their respective drainage areas which total 35.16 percent of the watershed.

All floodwater retarding structures and the multipurpose structure will have a vegetative plan drawn up based on their particular needs. The embankments, borrow areas, spillways and other disturbed areas will be treated. The embankments and emergency spillways will be vegetated with grasses such as bermuda or Pensacola Bahia. Borrow areas and other disturbed areas will be vegetated with grass to provide immediate cover and may also be planted to trees. Woody plants adapted for wildlife will be considered in areas where they will not interfere with the operation of the structure. After seed and fertilizers have been applied, an application of a mixture of asphalt and mulch will be applied to prevent erosion until vegetation becomes established.

Channels. There are approximately 53.7 miles of flood prevention channel work planned in this watershed. The purpose of the channel work is to provide additional capacity for disposing of controlled outflow from the floodwater retarding structures and runoff from uncontrolled portions of the watershed and to get the channels into a proper flow condition so that future maintenance can be undertaken. The channels as planned will supplement the floodwater retarding structures and will further reduce flood stages, frequency of flooding, and flood plain area inundated.

Planned channel work varies from simple channel clearing with removal of loose debris to channel excavation. Of the 53.7 miles of planned channel work, about 31.9 miles is channel clearing and removal of loose debris (channel work type class IV), about 10.2 miles is channel clearing and

shaping (channel work type-class III), about 9.7 miles is channel enlargement (channel work type-class II), and about 1.9 miles is channel excavation or excavated floodway (channel work type-class I). The characteristics of the streams to be modified by construction activities are described in the environmental setting section of this statement.

Channel work type-class IV consists of cutting off brush and trees within the channel bank at ground level with chain saws or similar type equipment, snaking to top bank and thence to the disposal area, removing loose debris, and removing obstruction. Logs partially submerged and firmly lodged in the bottom areas of the channel will not be removed. In the above banks right-of-way areas, a minimum of clearing for access, work, and disposal areas will be accomplished.

Channel work type-class III will be essentially of the same intensity as class IV with the major exception of shaping the banks and/or bottom at restricted locations for more uniform channel size and flows. This type work will alter the channel banks more at the restricted locations than will class IV work. Also, there will be more clearing above bank for work and disposal areas at these same restricted locations.

Channel work type-class II is enlargement of the existing channel and consists of removing the vegetation from within the channel banks, removing dirt from at least one bank of the channel, and deepening the channel bottom where necessary. Over bank clearing will be limited to that area necessary for access, work, and disposal areas. Since more work will be accomplished and more disposal than described in class IV work will be necessary, more over bank clearing will be necessary.

The channel work for classes II, III, and IV will be accomplished from one side at all possible locations and will follow the existing channel alignment. Where most above bank clearing is to be accomplished, shade and safe overhanging trees will be left, where possible.

Channel work type-class I is the construction of a new channel. The channel location, access, work area, and disposal areas will have to be cleared; however, as many selected trees (mast and shade) as possible will be left. The channel will be formed by excavating dirt. This excavated dirt will be disposed of as spoil in the spoil banks, hauled away, or disposed of by other sources.

Planned channel work on main Okatoma Creek below Floodwater Retarding Structure No. 17, reach by reach, is as follows. From Floodwater Retarding Structure No. 17 down to about the confluence of Goodwater Creek near the community of Coats, channel enlargement and channel clearing and shaping is the planned work. This reach is approximately 5 miles (Station 3238+00 to 2965+00).

In the reach from Coats down to about Mt. Olive which is about 11 miles (Station 2965+00 to 2450+00), mostly channel clearing with removal of loose debris is planned. The exception to this is a segment of about 6,500 feet toward the upstream end of the reach where channel clearing and shaping will be performed.

In the reach from Mt. Olive down to about Kola, the planned work will be channel clearing and removal of loose debris with the exception of a short reach near Collins and a transition section below, and a reduction in the amount of within bank clearing from below the transition section to the end of work. In the lower section where reduced clearing is to be done, the work will consist of removal of debris from the channel bottom and selective removal of hazardous trees. The length of this entire reach is about 21 miles (Station 2450+00 to 1200+00). Between Station 1556+00 and 1411+00 on Okatoma Creek, there will be an excavated floodway. This floodway will be 10,000 feet long as opposed to a creek distance of 14,500 feet. The bottom of the floodway will be about four feet higher in elevation than the present bottom of Okatoma Creek. The floodway will leave Okatoma Creek at Station 1556+00 but will rejoin the present creek just above Highway No. 84.

The floodway and creek will flow under the highway bridge together and separate again just below the highway bridge. The floodway will rejoin the creek at Station 1411+00 on Okatoma Creek. Downstream from this point, there will be a transition section from enlargement back to channel clearing and removal of loose debris. Within the floodway section at the points where it enters and leaves the creek, there will be armor plating with riprap. Okatoma Creek will function alone until the water level reaches the four-foot stage. Above this point, both Okatoma Creek and the floodway will function. The base flow and low-flow will continue to flow through Okatoma Creek just as under present conditions with the high flows split between the creek and floodway.

The planned channel work on Mill Creek tributary is clearing and shaping from Okatoma Creek (Station 0+00) up to Station 110+00. The remainder of the work is channel clearing and removal of loose debris (Station 110+00 to 261+50).

Channel work is planned for the reaches between Floodwater Retarding Structures Nos. 14 and 16, which are in series above Floodwater Retarding Structure No. 17 down to the sediment pool of Floodwater Retarding Structure No. 17. Channel enlargement and some realignment is planned for the reach of Okatoma Creek from the sediment pool of Floodwater Retarding Structure No. 17 up to the junction of Haw Branch and Dry Creek, which is the upper end of Okatoma Creek (Station 3377+50 to 3466+00). From this junction point upstream toward Floodwater Retarding Structure No. 16 to Station 3656 +25, channel enlargement with some realignment is planned. From that point up to Floodwater Retarding Structure No. 16, channel clearing and removal of loose debris is planned. From the junction up Haw Branch toward Floodwater Retarding Structure No. 14, the planned channel work is channel clearing with removal of loose debris.

Where channel clearing is the planned activity, over bank areas outside the limits of the channel proper will be cleared only enough to allow for equipment movement, disposal of cleared material, and construction of an access road for maintenance. Construction activities associated with channel excavation reaches will be primarily to widen the channel with little effect on depth. Degradation of laterals and tributaries with significant drainage areas is therefore not anticipated.

Adverse effects to the stream fishery resource have been carefully considered in planning channel work features. Planned channels have been kept to an absolute minimum to achieve flood control objectives. All areas to be cleared for construction will be revegetated as soon as reasonably possible. Where channel bank clearing is to be done, the cutting will be accomplished using hand operations and small machinery wherever possible to minimize disturbance of the natural banks. This will allow the banks and bottom to remain stable, thus disturbing the fish habitat very little. Selected overhanging trees will be left for shade and wildlife food. Determination of trees to be cut will be jointly determined by a team consisting of a construction engineer and a biologist. The entire right-of-way for channel work will not be cleared. Only sufficient area for a work and disposal area will be cleared. The channel will be cleared and constructed from one side where possible. The clearing of the channel rights-of-way on a where necessary basis for work, maintenance, and disposal areas through forest lands will reduce the amount of wildlife habitat lost and will maintain the continuity of the forest area along the streams. By the process of clearing in and out, around, and under the larger trees, the character of the forest will be changed very little as viewed from above.

Pipe overfall structures will be installed as appurtenances to the channel work. These structures are planned in most cases in areas where the flood plain is open. The approximate number and location of pipe overfall structures needed were determined by a study of the open lands draining field water directly into the proposed channel work. The exact location of these structures will be determined at the time of final design of the channel work.

As construction progresses a temporary vegetative program will be carried out to protect disturbed areas on channel side slopes, berms, spoil banks, and access roads. This will consist of smoothing up the areas, fertilizing, and seeding. The seed used will depend on the season. Examples are Pensacola Bahia, Common Bermuda, Browntop Millet, Fescue, or a combination of grasses. After construction is completed, a permanent vegetative program will be decided upon. Where the channel is through forested areas, the vegetation will normally consist of grasses such as those listed above. Where the channel work is through open land areas, the vegetation will normally consist of grasses such as those listed above plus specific plantings of shrubs such as autumn olive, Russian olive, Tartartion honeysuckle, bicolor lespedza, sawtooth oak, and Cretagus. Permanent type vegetation may include willows or kudzu to prevent erosion of the channel slopes at weak areas such as curves or meanders or where the soils are very erosive.

The right-of-way needs for the channel work are estimated at about 583 acres, of which 47 acres are open land and 536 acres are forest. It is estimated that about 158 acres of the forest acres will be cleared during construction.

Collins Airport Levee System. A levee with appropriate inside and outside water removal appurtenances will be installed on all four sides of the Collins Airport. The top of this levee will be set two feet above

the 100-year storm profile (2 ft. freeboard). Elevations of the levee will be 278.4 ft. MSL at the upstream (NW) end and 275.6 ft. MSL at the downstream (SE) end.

The interior drainage or water removal will consist of an outlet pipe through the levee with a flood gate on the outer end to keep Okatoma Creek out-of-bank flow from entering the protected area. A 6,000 gpm pump with appurtenances will be installed to remove runoff from precipitation on the protected area when Okatoma Creek is at flood stage.

The exterior drainage or water removal will consist of two open channels, the first of which will be along the lower 1,600 feet on the west side emptying into a natural channel just south of the airport. This natural channel will be cleared and loose debris removed to its outlet into Okatoma Creek just below Highway 84. The second open channel will be along the upper 4,000 feet on the west side and will discharge through an outlet pipe with floodgate constructed in a cut-off levee into a natural channel on the north end of the airport, and from there to Okatoma Creek. A cut-off levee will be installed at about Station 34+00 to divide the water on the west side between south and north flows. The water on the east side of the airport will drain naturally into Okatoma Creek.

Public Recreation. Recreation facilities will be installed adjacent to and in conjunction with Multiple Purpose Structure No. 1. There will be a total of 1,015 acres of land available for recreation at this location. Some 275 acres will be in the recreation pool, 183 acres will be taken up by recreation facilities, and 557 acres are necessary for the dam and reservoir.

The recreation facilities to be installed at Multiple Purpose Structure No. 1 will include facilities for picnicking, camping, boating, fishing, swimming, and hiking. The picnicking facilities will consist of 40 picnic units (2 tables, 1 fireplace and 1 underground garbage can mount), two 20 feet by 20 feet group shelters with fireplaces, one 20 feet by 20 feet pavilion with an eight-unit comfort station, a six-unit comfort station, ten water fountains, and hard surface parking for 80 automobiles. The camping facilities will consist of 40 camping units (a raised tent mound, picnic table, an underground garbage can mount and fireplace), a 12-unit comfort station and laundry, sewage dumping station, twenty water outlets with double faucets, parking barriers for each camping unit and hard surface parking for 25 single vehicle units and 24 double vehicle and trailer units. The boating and fishing facilities will consist of two boat ramps (100 feet by 20 feet), one boat dock (100 feet by 4 feet), one fishing pier (100 feet by 8 feet), a four-unit comfort station, and hard surface parking for 50 single vehicle units and 50 double vehicle and trailer units. The swimming facilities will consist of a one-acre sand beach, a retaining wall (300 feet by 5 feet), swimming area boundary markers, an eight-unit bath house, and hard surface parking for 100 automobiles. Hiking facilities will consist of a 6,000-foot nature trail. Support facilities will consist of fencing, electrical lines, water lines, a water well and pump, sewage lines, a lagoon, landscaping, signs, etc.

The Seminary Area is a streamside recreation facility to be installed in conjunction with a portion of the lower reach of Okatoma Creek. The reach of Okatoma Creek within the Seminary Recreation Area will have debris removed from within the channel banks so as to improve the water resource, and to protect the rock overfalls and stream banks. The west bank of the channel will be fenced except at proper access points to reduce the danger of children falling into the stream and to protect the stream banks from foot traffic. Facilities for picnicking, camping, and hiking will be provided at this area. There will be 21 picnicking units, 20 camping units, and a mile-long nature trail. These facilities will have the same features as listed for like facilities at Multiple Purpose Structure No. 1. The facility construction will be such that flooding will cause a minimum of damage.

The facilities listed above will be open to the public and access roads will be provided. The facilities at both the Seminary Recreation Area and Multiple Purpose Structure No. 1 will be designed for use by the physically handicapped with a minimum of difficulty. The installation of the water, sewage, and recreation facilities will be in accordance with the requirements of state and local agencies having specific interests or jurisdiction in the specific construction. Plans and specifications for public water supply and recreation facilities will be subject to the review and approval of the Mississippi State Board of Health and the plans and specifications for sewage facilities will be subject to review and approval by the Mississippi Air and Water Pollution Control Commission before construction begins. Where water contact sports are planned for a body of water, the Board of Supervisors in the applicable county or counties will be requested to adopt appropriate subdivision regulations or zoning ordinances to prevent development on privately owned land in the watershed which might cause degradation of the quality of the water. Water quality in the recreation lake will be monitored by the sponsors, especially before and during the water contact sport season to assure safe water quality. The drainage area above MPS-1 was studied for significant pollution sources which might cause the water to be unsatisfactory for contact sports with none discovered; however, an additional study will be made prior to construction. The recreational areas will be supervised and managed so that the areas can be made as safe for use as reasonably possible. In the Seminary Recreation Area, special contact will be maintained with the upstream towns of Collins and Mt. Olive during times of severe storms so as to provide adequate warning for people utilizing the area to remove their property and themselves from the area to a safe location.

The plans and specifications for the water supply facilities and for the recreation area facilities will be reviewed and approved by the Mississippi State Board of Health prior to construction to assure proper design for health and physically handicapped use considerations. The Mississippi Air and Water Pollution Control Commission will be asked to review and approve the sewerage treatment facilities prior to construction.

Installation Procedures - Structural Measures. Soil erosion and water, air and noise pollution will be minimized by following SCS Engineering Memorandum-66 and applicable state guidelines related to erosion and

pollution. Some of the measures which will be used to reduce erosion and sediment are: 1. limiting the exposure of erodible soils to the shortest time reasonably possible; 2. use of temporary vegetation where exposure time of erodible soils will be excessive; 3. retardation of runoff by mechanical means where necessary; and 4. trapping sediment in debris basins. Some of the measures which will be used to reduce water, air and noise pollution are: 1. application of dust suppressors or water on haul roads and construction areas for dust control; 2. use of temporary bridges or culverts on running streams; 3. careful handling of chemicals, fuel, lubricants, sewage, etc., to prevent spillage; 4. maintenance of construction equipment engines, muffler and exhaust systems in good working condition; 5. regulation of burning at construction sites to times when wind and burning conditions are proper; and 6. location of access and haul roads away from homes as much as possible.

The Mississippi Department of Archives and History was contacted regarding preservation of archeological and historical data within the watershed, especially within the proposed construction areas. A map of the watershed on which proposed dam sites and channel modifications were located was discussed. The Director, Division of Historic Sites and Archeology, of the above-mentioned department states that there are no adequately located sites in those portions of the watershed which have been studied on a preliminary basis, and no recorded sites in the remainder. He further states that an adequate survey has not been made of the area.

An archeological survey in the Okatoma Creek Watershed with particular emphasis in the areas affected by the proposed structural works was completed by the Mississippi Department of Archives and History. The Director of this department is the State Historic Preservation Officer. Some six archeological sites were located in the watershed area. These sites are recorded as sites 22-Cv-501, 502, and 503; sites 22-Sm-505; and sites 22-Si-508 and 509. The above listed sites represent a considerable time span of occupation. Though the area was used by prehistoric people for a great length of time, activity was not intense. No permanent stratified sites were recorded and all of the sites are considered hunting camps. Lithic debris and artifacts are abundant on most sites indicating that the occupants engaged in toolmaking activities, probably associated with hunting deer and other game. None of the above-mentioned sites are considered as candidates for National Register application. The report states and a search of the latest National Register publication indicates that there are no National Register sites within the watershed area.

The Reservoir Salvage Act of 1960 (PL 86-523; 74 Stat. 220) is applicable to this project because several of the sediment pool surface areas and the recreation pool surface area are larger than 40 acres. The Secretary of Interior will be notified of this fact at the proper time.

Land Use Changes: The use of upland for cropland will decrease through application of the planned land treatment program, as cropland moves to terrace and bottom land areas protected by structural measures. Pasture and forest will replace this upland cropland. In addition, pasture and forest will replace some of the upland-cropland that goes out of production because of inefficient commitment of production factors. Forest is expected

to replace some of the upland pasture, also because of inefficient commitment of production factors. In the flood plain areas not protected by structural measures, no appreciable change in land use is expected. Some shift may occur, however, from cropland and pastureland to forest land. In the flood plain areas that will receive protection by structural measures, an additional five percent is expected to be converted to cropland and eight percent to pastureland with a decrease of thirteen percent in forest land. The following table shows the present land use and the projected land use expected after project installation.

Land Use	Present Acres	Projected Acres
Cropland	15,726	15,391
Grassland	52,312	54,560
Forest Land	100,340	102,467
Wildlife and Recreation	455	3,000
Other	8,093	1,508
Miscellaneous	2,279	2,279
Total	179,205	179,205

Operation and Maintenance: Land treatment measures on private land will be operated and maintained by landowners and operators under cooperative agreements with the Soil Conservation Districts of Covington, Simpson, Jones, Smith and Forrest Counties. The operation and maintenance of these measures will be the financial responsibility of the individual operators and landowners. Operation and maintenance of critical area plantings will be financed by the Okatoma Creek Water Management District from its regular maintenance funds.

The private forest land treatment measures will be maintained by the landowners and operators under agreement with the Covington, Simpson, Jones, Smith and Forrest Counties Soil and Water Conservation Districts. The Mississippi Forestry Commission in cooperation with the U. S. Forest Service will furnish the technical assistance necessary for operating and maintaining the forest land treatment measures under the going Cooperative Forest Management Program. They will also continue to furnish fire protection under the Cooperative Forest Fire Control Program.

The Boards of Supervisors of Covington, Simpson, Jones, Smith, and Forrest Counties will be responsible for maintaining the land treatment measures on Sixteenth Section lands.

The Okatoma Creek Water Management District will assume the responsibility to operate and maintain the floodwater retarding structures and the flood prevention channels. Operation and maintenance funds will be secured through assessments as provided in Mississippi Senate Bill 1220, extraordinary session 1955. The estimated annual cost for operating and maintaining the floodwater retarding structures and flood prevention channels is about $28,200 which includes replacement costs for overfall pipes, water level control devices, and the low flow augmentation devices.

The Okatoma Creek Water Management District will operate and maintain the flood prevention aspects of Multiple Purpose Structure No. 1, which includes the dam, principal spillway, and emergency spillway at an estimated annual cost of $1,500. Flood prevention operations and maintenance funds for this structure will be secured in the same manner as for floodwater retarding structures and flood prevention channels. The Pat Harrison Waterway District will assume the responsibility to operate and maintain the recreation aspects of this structure and the basic facilities both here and at the Seminary Recreation Area. Estimated annual cost of this recreation associated operation and maintenance responsibility is $49,300 which includes replacement cost of facilities.

The Pat Harrison Waterway District operation and maintenance funds will be provided from its regular operating budget. The recreation enterprises will be operated and maintained through lease arrangement with the Okatoma Creek Water Management District. No such agreements have been entered into at this time. However, these lease agreements will provide for use fees to be charged to users of the facilities. Such fees will be limited to the amount needed to amortize the initial investment and to provide adequate operation, maintenance and replacement. In addition, these lease agreements will provide for the custodial, policing, sanitation, safety and other operational services for the recreational developments.

The Town of Collins will operate and maintain the Collins Airport Levee System which includes the levee, the interior drainage system, pump, pump house, outlet pipe and flood gate, exterior drainage system, drainage pipe and flood gate at an estimated annual cost of $1,000.

The annual cash sum of approximately $8,000 will be raised by the Okatoma Creek Water Management District through annual assessment to defray the cash obligation of said project for operation and maintenance of structural measures and for replacement costs for parts of structures having a shorter life than 100 years. The balance of the annual operation and maintenance costs will be contributed as services in kind such as labor, equipment hire, and materials by the benefited landowners and operators in the watershed. These services will be arranged for by the Okatoma Creek Water Management District.

The maintenance of the floodwater retarding structures and the multiple purpose structures will include removal of debris from principal spillways, maintenance of adequate vegetation on the embankments and emergency spillways and repair of any damage resulting from flood events. There may be specific problems with beavers in the operation of these structures. Where this occurs, the District will seek assistance and advice from the Game and Fish Commission on how to handle the problem. The Okatoma Creek Water Management District and the Pat Harrison Waterway District fully understand the requirements for adequate operation and maintenance and arrangements will be made to satisfy these requirements.

The maintenance of the flood prevention channels will be accomplished by the use of sprays and/or labor and equipment to control obnoxious vegetative growth. This maintenance will assist in the promotion and growth of desirable vegetation for stream bank erosion control and wildlife habitat. Where sprays are used for maintenance, their use will conform to all applicable laws and/or rules and regulations. Additional maintenance will include the removal of drifts, debris, and/or silt bars as necessary. There may be problems with beavers on Mill Creek channel and the upper part of Okatoma Creek channel. If this occurs, the Game and Fish Commission will be contacted.

Travelways for maintenance will be constructed as a part of the construction contract. These travelways will be adequate for movement of operation and maintenance equipment required for maintenance of the channels. They will be maintained as a part of the channel system.

The Okatoma Creek Water Management District will operate and maintain the water level control devices in the 14 floodwater retarding and one multiple purpose structure and the nine low flow augmentation devices. The operation and maintenance of these devices will be performed on a local contract basis at District expense. The Mississippi Game and Fish Commission will be consulted and the water level control devices and low flow augmentation devices will be operated in accord with their recommendations and project objectives. The District will encourage landowners to provide public use of the wildlife and fishing areas.

Inspections will be made by the Soil Conservation Service and by the Okatoma Creek Water Management District on the 14 floodwater retarding structures, the multiple purpose structure, and the flood prevention channels; by the Pat Harrison Waterway District on the multiple purpose structure and the Seminary Recreation Area; and by the Town of Collins on the Collins Airport Levee System. These inspections will be made as frequently as necessary, at least annually, and after unusually severe floods or any other unusual conditions that might adversely affect the structural measures. These inspections will continue for three years following installation of each structural measure. Inspections after the third year will be made annually by the sponsors. They will prepare a report and send a copy to the Soil Conservation Service employee responsible for operation and maintenance and follow-up. Where needed, the Soil Conservation Service employee may continue to provide assistance after the third year as determined by the State Conservationist.

The Soil Conservation Service and the local sponsors will be especially careful in inspecting the channel work until aged conditions are obtained so as to detect any sign of instability early. If signs of significant instability are detected, corrective action will be undertaken at the earliest feasible time.

Detailed plans for operation and maintenance will be contained in the Watershed Protection Operation and Maintenance Agreement, which will

be executed prior to issuing invitations to bid on construction work. The State Operations and Maintenance Handbook will be used as a guide in preparing the Watershed Protection Operation and Maintenance Agreement.

The Water Management District Commissioners will be responsible for advertising the remaining flood damage areas at the towns of Mt. Olive, Collins, and Seminary and the village of Sanford to the concerned people at least once per year until such time as protection is provided.

Project Costs: The project costs are shown in the following table:

Okatoma Creek Watershed
Cost Data

Item	Costs (Dollars)		
	PL-566	Other	Total
Land Treatment	651,400	2,295,700	2,974,100
Structural Measures	5,030,100	1,044,300	6,074,400
Construction	(3,914,600)	(267,800)	(4,182,400)
Total	5,681,500	3,340,000	9,021,500

ENVIRONMENTAL SETTING

Physical Data

Location

Okatoma Creek Watershed is a 179,205 acre watershed located in southeastern Mississippi with 106,965 acres (60 percent) in Covington County, 52,383 acres (29 percent) in Simpson County, 10,759 acres (6 percent) in Jones County, 8,973 acres (5 percent) in Smith County, and 125 acres (less than 1 percent) in Forrest County. Towns and communities in or on the boundaries of the watershed are Collins, Magee, Mt. Olive, Seminary, Martinville, Maddox, Coats, Arbo, Ora, Kola, Sanford, Smith, Cyclone and Lux. The City of Hattiesburg is located approximately six miles south of the lower watershed boundary and the City of Jackson is about 35 miles northwest of the upper boundary. The watershed population is estimated at about 13,100. About 7,000 of these are rural and 6,100 non-rural (town). The 1970 census was used as a basis for these estimates. The non-rural population includes all of those people living within the towns of the watershed.

The watershed is located in the southwest portion of the South Atlantic Gulf Water Resource Region and the upper portion of the Pascagoula River Basin Sub-region. In general, the characteristics of the watershed are about average for the region and sub-region. The watershed's location in the southern and western portion of the region tends to make it deviate from the average in respect to climate, topography, soils and watershed problems.

The climate is warmer than the regional average with more rainfall especially in the summer months. The topography is less severe than the average for the region. The soils of the watershed were developed under mostly pine forest conditions as opposed to hardwood forest conditions which usually tends to produce less fertile soils. The watershed problems deviate because of the variance in climate, topography and soils from the average for the region. The topography of the watershed is steeper, the growing season shorter, the annual rainfall less, the flood plains wider, and the land use of the flood plains more intense than the average for the sub-region.

Water Resource Problems

There are 37,210 acres of land within and scattered throughout the watershed that are subject to flooding. This land is now being utilized for agricultural and silvicultural production (cultivation, pastures and trees), roads and bridges, urban areas, and miscellaneous uses. In the upland portion of the watershed, there are about 136,900 acres of land subject to erosion (sheet and/or gully). There are 1,634 acres of critical eroding lands scattered throughout the upland watershed areas. The present channels on the upper two-thirds of the main stem and on most of the tributary streams have insufficient capacity because of siltation, debris, trash and other restrictions to adequately remove the surface run-off from excess rainfall.

Land

The watershed lies entirely within the Southern Coastal Plains Physiographic region, locally known as the Pine Hills. The region is a maturely dissected highland, the surface of which slopes from a fairly rugged topography in the north to gently rolling hills at the southern and eastern margins.

The watershed is made up of several formations starting from the southeast portion of the watershed near Lux with the oldest formation to the youngest formation, just north of Martinville. Pascagoula and Hattiesburg clays are of the lower Miocene age, Catahoula sandstone of the upper Miocene age, and finally the Citronelle formation of the Pliocene age.

The Pascagoula and Hattiesburg clays are made up of irregularly bedded green and bluish green clay, sandy clay and sand; gray siltstone and sand, locally fossiliferous.

The Catahoula sandstone formation is comprised of irregularly bedded gray sand and sandstone; mottled red, gray green, and chocolate colored clay and some gravel cross bedded fine green sand and thin bedded sand and clay.

The Citronelle formation consists of red sand and gravel and white clay. This formation is equivalent to the Willis sand and does not include terrace deposits, colluvium and residuum, commonly considered Citronelle.

Soils are formed from Coastal Plain sands, clays and gravels. The soils are low in natural fertility, contain little organic matter and are largely acid in reaction. Erosion is generally moderate to severe.

Principal upland soils are Ruston and Ora. Ruston is a deep, well drained friable soil. Ora is a moderately well drained, friable soil over a fragipan. Other upland soils are Providence, Bude, Susquehanna, Angie, Pheba, Shubuta, Stough, Savannah, Boswell, Eustis and Myatt.

The estimated 136,888 acres of upland soils are classed as about 35 percent capability unit IIe, 14 percent - IIIe, 12 percent - IVe, 26 percent - VIe and 13 percent - VIIe.

The capability classification system[1/] is a grouping of soils that shows, in a general way, how suitable they are for most kinds of farming. It is a practical grouping based on limitations of the soil, the risk of damage if they are used, and the way they respond to treatment. Roman numerals I through VIII designate the broadest grouping. The Class I soils have few limitations, the widest range of use, and the least risk

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1/ Soil Survey, Covington County Mississippi, SCS, Beltsville, Maryland, Series 1961, No. 13, 1965.

of damage. The soils in the other classes have progressively greater natural limitations. For example, Class III soils have severe limitations that reduce the choice of plants, or that require special conservation practices or both, and Class VI soils have severe limitations which make them generally unsuitable for cultivation, limiting their use largely to pasture or range, forest land, or wildlife food or cover. The letter "e" shows that the main limitation is risk of erosion unless close-growing plant cover is maintained. The letter "w" means that water in or on the soil interferes with plant growth or cultivation and is the main limitation (in some soils the wetness can be partly corrected by artificial drainage).

The bottom land soils, about 38,600 acres, are in land capability units IIw - 22 percent; IIIw - 30 percent and IVw - 48 percent.

Principal bottom land soils are Mantachie, Iuka and Bibb. Mantachie is a friable, somewhat poorly drained soil. Iuka is a moderately well drained sandy loam or loam material. Bibb is poorly drained and is best suited to pasture and adapted hardwoods. Other bottom land soils are Ochlachnee, Collins, sandy alluvial land and swamp.

The mainstream valley widths average about 3,500 feet in the lower reaches, 2,500 feet in the middle reaches and 1,000 to 1,200 feet in the upper reaches. The tributary valleys range from 600 to 1,200 feet in width. The elevation above mean sea level ranges from about 170 feet at the outlet of the project at Bowie River up to about 520 feet along the northern rim of the watershed.

Climate

Based on the 1971 Annual Summary at Collins, Mississippi,[1/] the average precipitation is 54.54 inches. About 33.78 inches of precipitation occur during the crop growing season of April through November. The wettest month is July with an average of 6.12 inches and the driest month is October with an average of 2.50 inches.

The average annual temperature as transposed from Laurel is 66.1 degrees Fahrenheit. January is the coldest month with an average temperature of 50.1 degrees, and July is the hottest month with an average of 81.7 degrees.

The length of the growing season is about 230 days between the last killing frost in March and the first killing frost in November.

Mineral Resources and Ground Water Resources

Water for domestic use is supplied from drilled wells, dug wells and springs. Livestock water is obtained from drilled wells and ponds. Abundant

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1/ Climatological Data, Mississippi Annual Summary, 1971, U. S. Department of Commerce, National Oceanic and Atmospheric Administration, Environmental Data Service.

ground water resources underlie the Pascagoula River Basin, of which the watershed is a part.1/ Most of the ground water now being used in the watershed is being withdrawn from the Claiborne Group and the Miocene Beds. The major aquifers used are the Catahoula Sandstone and the "undifferentiated Miocene" aquifers.2/ Quality of the ground water is adequate for most uses.

Generally, there is sufficient moisture during the growing season to produce crops. However, according to the "Palmer's Index"3/ for the area, there are periods of moisture deficiency in almost every growing season. Suitable supplies for irrigation from deeper sources are not as readily obtainable as those for other purposes because of the natural predominance of water of a sodium bicarbonate type in deeper aquifers of the study area.1/ There are indications of adequate supplies of acceptable quality ground water occurring in shallower aquifers.

The table on page 23 indicates the quality of ground water now being used.

Sand and gravel deposits are located throughout the watershed. The largest concentrations are found along the ridges in the Citronelle formation, but varying amounts are also found in the Catahoula formation, terrace deposits and alluvium. Most of the sand found in the Catahoula is indurated at the surface and is difficult to mine. The terrace deposits are primarily sand with minor amounts of pea gravel. The sand in the alluvium usually contains high contents of silt. There are no commercial sand or gravel plants within the watershed, but several roadside pits produce sufficient gravel for county road work and other local use.

There are no oil or gas wells within the watershed but there is oil and gas activity near the watershed boundary at several locations. Therefore, the probabilities are good that oil and/or gas are present in the watershed. There are several pipelines crossing the watershed in different directions. These pipelines are transporting crude oil, natural gas or other petroleum. products.

Land Use

The present land use of the watershed is about 9 percent cropland, 29 percent pasture and perennials, 56 percent forest land, and 6 percent miscellaneous and idle land. In the upland area, the present land use is about 10 percent cropland, 30 percent pasture and perennials, 54 percent woodland, and 6 percent miscellaneous and idle land. In the bottom land and flood plain area, the present land use is about 4 percent cropland, 29 percent pasture and perennials, 66 percent forest land, and one percent miscellaneous and idle.

1/ Appendix K, Pascagoula River Basin Comprehensive Basin Study, "Geology and Ground-Water Resources of the Pascagoula River Basin," by Roy Newcome, Jr.

2/ Public and Industrial Water Supplies in Southern Mississippi, J. A. Callahan, USGS, 1971, Bulletin 71-1.

3/ U. S. Department of Commerce, National Oceanic and Atmospheric Administration, Environmental Data Service.

Analyses of Water From Selected Wells in Covington County[1/]

(Dissolved Constituents and Hardness Given in Milligrams per Liter)

Well No.	Water-Bearing Unit	Depth (ft)	Date of Collection	Silica (SiO2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO3)	Sulfate (SO4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO3)	Dissolved Solids	Hardness as CACO3	Specific Conductance (Micro-MHOS at 25°C)	PH	Color
B001	TMMZ	210	1 59	7.3	.04	16	4.6	6.3	3.2	76	7.2	3.0	.2	.2	98	59	146	7.4	6
B002	TMMZ	400	4 66	52	.28	4.7	.9	18	4.3	52	9.0	2.8	.1	.0	112	15	114	6.6	0
F001	TMMZ	240	4 66	23	.06	2.5	.7	2.0	1.6	13	.6	2.1	.0	.2	45	9	36	6.0	5
F002	TMMZ	217	9 59	5.5	.07	2.5	.6	2.1	1.6	12	1.0	2.2	.1	.4	40	0	34	6.8	6
F003	TMCA	741	4 66	43	.12	4.0	.8	56	3.0	144	11	3.6	.2	.0	187	13	257	7.7	--
F004	TMMZ	170	4 66	43	.94	17	4.4	11	3.8	98	3.6	6.0	.1	.2	131	61	180	6.7	10
K001	TMCA	249	4 66	5.4	.51	10	3.3	8.5	2.0	52	5.4	6.6	.2	.0	98	39	115	6.8	0

Note: TMMZ - Miocene undifferentiated and TMCA - Catahoula Sandstone

1/ Public and Industrial Water Supplies in Southern Mississippi, J. A. Callahan, USGS, 1971, Bulletin 71-1.

Vegetative cover for the entire watershed is generally good. The hydrologic cover condition of the pastureland is approximately 52 percent good, 37 percent fair and 11 percent poor. Miscellaneous and idle lands in the watershed are rated approximately 50 percent good, 44 percent fair and 6 percent poor. The hydrologic cover condition of the cropland is 96 percent good and 4 percent poor.

Of the 56 percent (100,340 acres) of the watershed which is forest land, 14 percent is in fair hydrologic condition, 51 percent poor, and 35 percent very poor. These poor conditions were caused by burning, over-cutting, over-grazing, and past cultivation of lands which are now forested. Eleven percent of the forest area shows moderate to severe damage from logging primarily consisting of abandoned log roads and skid trails. Twenty-one percent of the forested areas shows moderate to severe damage from grazing.

Surface Water Resources

All of the streams in the watershed are natural channels, except for minor segments in the vicinity of road crossings, many of which have been improved for a short distance upstream and down for better bridge alignment and/or increased channel capacity.

Main Okatoma Creek, which is a perennial stream, is formed by the junction of Haw Branch and Dry Creek approximately four miles southeast of Martinville, and about three miles northeast of Magee. It generally meanders southerly for some sixty-six miles to its confluence with Bowie Creek, approximately seven miles northwest of Hattiesburg. Bowie Creek and Okatoma Creek join to form the Bowie River.

Okatoma Creek has many tributaries varying in size from as small as one tenth of a square mile drainage area up to as large as about 19 square miles drainage area. The main tributaries are Shelton Creek, Nichols Branch, Bullock Creek, Curry Creek, Gin Branch, Big Swamp Creek, Rogers Creek, Blackely Creek, Burtons Creek, Tanner Branch, Shelby Creek, Leonards Mill Creek, Mt. Olive Lateral, Uspoha Creek, McLauren Creek, Goodwater Creek, Mill Creek, Dry Creek and Haw Branch. Several tributaries are not named and for purposes of reference here are identified as laterals to various dam sites, such as Lateral to DS #3 or Lateral to DS #19.

The following table shows various stream and/or stream related characteristics for segments of Okatoma Creek and several of its major tributaries.

STREAM CHARACTERISTICS

Stream and Reach	Bottom Width Feet	Side Slopes	Depth Feet	Degree of Obstruction	In Bank Veg.	Channel Bottom Material	Immediate Over Bank Land Use	Degree of Sediment deposition	Degree of Bank Stabl.	Meander	Type of Channel	Degree of Beaver Dams	Remarks
Okatoma Dry to Goodwater Creek	4-10	1/2-1	1-4	high	grass weeds	silt, clay sd. grav.	grasses and brush	high	fairly stable	fairly freq. bends	P	moderate	Stream banks generally less than 3 feet high. Siltation has reduced overall stream depth by 2 to 5 feet.
Goodwater to Mt. Olive Lat.	12-30	1/2-1	1-3	high	weeds brush	silt, clay sd. grav.	brush and trees	high	light caving	fairly freq. bends	P	mod. to light	Stream banks usually less than 6 feet high. Same siltation as above.
Mt. Olive to Collins	30-45	1/2-1	2-12	high	brush trees	silt, clay sd. grav.	brush and trees	high	light caving	freq. bends	P	none	Banks stable except at bends. Bank heights vary with alternate high and lows. Same siltation as above.
Collins to Seminary	40-50	1/2-1	1-15	mod.	brush trees	silt, clay sd. grav. sandstone	trees and brush	mod.	stable	freq. bends	P	none	Water holes at each bend. There are some sand and gravel bars. Banks are very low in spots. Some sandstone outcrops in bottom. Same siltation as above.
Seminary to Lux	20-55	1/2-1	4-20	mod.	brush trees	silt, clay sd. grav. sandstone	trees and brush	low	stable	fairly freq. bends	P	none	Several small sandstone outcrops and some waterfalls. Some bank heights less than 4 feet but most in 4 to 6 foot range. Siltation less than described above.
Lux to outlet	20-55	1/2-1	8-20	mod. to high	brush trees	sd. grav. silt, clay	brush and trees	high	stable	fairly freq. bends	P	none	Large sand and gravel bars at bends. Siltation heavier than reach above, about to the level for the four upper reaches. Bank heights are as low as 8 feet in several places. Heights up to 50 feet in one location.

STREAM CHARACTERISTICS (continued)

Stream and Reach	Bottom Width Feet	Side Slopes	Depth Feet	Degree of Obstruction	In Bank Veg.	Channel Bottom Material	Immediate Over Bank Land Use	Degree of Sediment deposition	Degree of Bank Stabl.	Meander	Type of Channel 1/	Degree of Beaver Dams	Remarks
Dry Creek Haw Branch	4-10	1/2-1	1-4	high	grass weeds brush trees	silt,clay sand	cultivation grasses brush	high	stable	fairly freq. bends	I	none	Siltation has reduced the stream depth by several feet. Banks are almost level at spots.
Mill Creek Lat. to DS-19 Mt. Olive Lat. Lat. to DS-3 Shelby Creek	6-12	1/2-1	1-6	high to very high	grass weeds brush trees	sand silt clay	grasses brush trees	high to very high	stable	fairly freq. bends	I	moderate	Siltation has reduced stream size severely. Stream channels are clogged with weeds, brush, trees and debris.
Goodwater McLauren Uspoha Burtons Blackely Rodgers	6-20 mostly 10	1/2-1	1-10 mostly 2-6	high to very high	grass weeds brush trees	sand silt clay	brush grasses trees	high to very high	mostly stable	fairly freq. bends	P	moderate to high	Siltation has reduced stream size severely. Channels are clogged with sand, weeds, brush, trees, debris, and beaver dams.
Leonards Mill Gin Branch Bullock Creek Lat. to DS-21 Lat. to DS-22	6-10 mostly 8	1/2-1	2-6 mostly 2-4	high to very high	grass weeds brush trees	sand silt clay	brush trees	high to very high	mostly stable	fairly freq. bends	I	moderate to high	Same as above.
Big Swamp Creek Curry Creek Shelton Creek Nichols Branch	6-10	1/2-1	2-4	high to very high	grass weeds brush trees	sand silt clay	brush trees	high to very high	mostly stable	fairly freq. bends	P	moderate to high	Same as above.

1/ P = Perennial - flows at all times except during extreme drought.

I = Intermittent - Continuous flow through some seasons of the year, but little or no flow through other seasons.

The channels described in the previous table are generally in a poor state of maintenance. The capacity of the channels to carry excess water has been greatly reduced over the years by siltation and debris deposits within the channel banks, by vegetative growth (grasses, weeds, brush, and trees) on channel banks and channel bottoms, and in a large number of channels by beaver dams. The clogging of the channels has progressed to the degree that local landowners have great difficulty in establishing water removal systems for their farms.

In addition to the major drainages discussed above, there are numerous small streams, channels, drains and ditches that outlet into Okatoma Creek. Some of these are named, such as Military Branch, Taylor Branch or Tanner Branch. Most, however, are unnamed or otherwise not identified. The lengths of these channels vary from about a half-mile up to as much as two miles, with contributing drainage areas ranging from approximately one-tenth of a square mile up to about one square mile. The channel dimensions of these streams vary widely, from less than one foot in depth up to five or six feet. Bottom widths vary from about 5 feet up to 15 feet. These streams are primarily natural channels with ephemeral flow. The vast majority are clogged with trees, logs, stumps, brush and various other debris. Some of these channels have beaver dams built in them and most have significant depositions of sand and silt.

The Pascagoula Basin Water Quality Management Plan and the Mississippi Air and Water Pollution Control Commission indicate that industrial and municipal wastes are being discharged into Okatoma Creek, either directly or through tributary stream. The following table presents data relative to these industrial and municipal discharges.

WASTE DISCHARGES INTO OKATOMA CREEK[1/]

INDUSTRIAL DISCHARGES

Industry	Location	Completion Date	Discharge Information
Canfield Market	Collins	6-30-77	BPT
Butler Slaughterhouse	Collins	6-30-77	BPT
Masonite Corporation	Collins	6-30-77	BPT
Blain Sand & Gravel	Seminary	No Discharge at this Facility	
Warren Poultry Plant	Mount Olive	No Information Available	
Collinswood Poultry	Collins	3-1-75	BOD_5 = 170 #/Day TKN = 562 #/Day TSS = 252 #/Day
Shell Oil Company	Collins	5-1-75	BPT
Pine Belt Ready Mix	Collins	8-1-75	TSS = 30 mg/1
Miller Transporters	Collins	1-1-76	BOD_5 = 20 mg/1 TSS = 40 mg/1 Oil & Grease = 15 mg/1

Continued

MUNICIPAL DISCHARGES

Municipality	State Priority	Receiving Stream Conditions
Magee	50	Goodwater Cr.-Water Quality Limited
Mount Olive	93	Town Creek-Water Quality Limited
Collins	300	Okatoma Creek-Effluent Limited
Seminary	325	Okatoma Creek-Effluent Limited

1/ Mississippi Air and Water Pollution Control Commission.
Based on current data as of March 1975.

The table on the following page gives some additional indication of water quality for Okatoma Creek and several surrounding streams.

Other than streams, the surface water resources within the watershed consist of about 840 farm ponds and the 25-acre Legion Lake on Shelby Creek. The ponds range in size from less than one acre to several acres with an estimated average of about 0.75 acres. The smaller ponds will average about 4 to 6 feet in depth with the larger ones averaging 8 to 10 feet. The Mike Conner Lake with about 88 acres and the Simpson County Legion Lake with about 94 acres are located just outside the watershed boundary. About 170 of the farm ponds along with the three larger lakes are managed for fish.

Pascagoula River Basin[1]

Miscellaneous Analyses of Streams in Pascagoula River Basin in Mississippi

Chemical Analyses in Milligrams Per Liter

Date of Collection	Discharge CFS	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$: Calcium Magnesium	Hardness as $CaCO_3$: Noncarbonate	Specific Conductance (Micromhos at 25°C)	PH	Color
Okatoma Creek at Sanford, Miss.																		
March 5, 1969	--	8.0	0.09	1.9	0.5	3.6	1.1	10	0.8	4.9	0.1	1.0	45	7	0	38	6.0	40
Leaf River Near Collins, Miss.																		
March 5, 1969	980	8.5	0.19	8.6	1.3	7.4	1.0	22	6.2	16	0.0	0.1	81	27	9	98	6.4	60
Bowie Creek Near Hattiesburg, Miss.																		
March 5, 1969	226	8.6	0.07	2.5	0.4	2.6	0.7	10	1.8	3.1	0.0	0.4	44	8	0	27	6.1	30
June 12, 1969	142	9.8	0.03	1.6	0.5	2.4	0.8	10	0.2	3.0	0.0	0.3	27	6	0	27	6.0	20

1/ Water Resources Data for Mississippi, U. S. Department of Interior, Geological Survey, 1969.

Economic Data

The watershed area is of an agricultural nature with farming and related industries being of vital importance to the economy of the watershed. The production of livestock and poultry products are the major sources of farm income. Feed crops are grown primarily for on-farm use in livestock enterprises. The production of soybeans is on the increase and a small amount of cotton is still being grown in certain areas of the watershed.

Principal crops presently grown in the watershed and their average yields are corn (35 bushels per acre), soybeans (20 bushels per acre), and cotton (365 pounds per acre). Pasture yields for the watershed as a whole average 210 pounds of beef per acre. Within the water problem areas of the watershed, principal crops are corn and soybeans. Average yields for these crops are 72 and 40 bushels per acre, respectively. Pasture yields in these areas average 247 pounds of beef per acre.

The forest types are 70 percent pine, 14 percent pine-hardwood, eight percent hardwood-pine and 8 percent hardwood. Principal tree species in these areas are loblolly pine, long leaf pine, slash pine, red oak, white oak, sweetgum, black gum, hickory and elm. Eighty-nine percent of the forest area is well stocked with merchantable tree species.

The average growth rate for all forest land is about 62 cubic feet per acre per year. The rate for pine averages about 80 cubic feet and hardwood averages about 38 cubic feet per acre per year. Within the hardwood, oak averages about 24 cubic feet per acre per year and gum averages about 73 cubic feet per acre per year.

There are no lands administered by the U. S. Forest Service in this watershed. The Mississippi Forestry Commission manages 3,800 acres of Sixteenth Section forest lands. Industrially owned lands account for 8,059 acres and the remaining forest land is in small privately owned tracts.

The Mississippi Forestry Commission in cooperation with the U. S. Forest Service by and through the various Federal-State cooperative forestry programs, is providing forest management assistance, forest fire prevention and suppression, distribution of planting stock and forest pest control assistance to private landowners in the watershed.

Public lands within the watershed consist of approximately 3,800 acres of Sixteenth Section lands (school lands).

Family type farms are predominant throughout the flood plain and upland areas of the watershed. There are approximately 1,433 farms in the watershed that will average about 115 acres in size with an average value of about $16,000 for land and buildings. Trends in the watersheds reflect a decrease in number of farms, and an increase in the value of land and buildings.

Based on county Agricultural Census data for 1969, the average value of all farm products sold was about $11,500 per farm. Of this amount, poultry

and poultry products accounted for about 73 percent of the total. Even though the average value of farm products sold per farm was $11,500, the value of farm products sold was less than $2,500 on 67 percent of the farms.

As a result of increased cost of living, farm operators have had to find other employment to supplement their farm incomes. In 1969 approximately 53 percent of the farm operators worked off-farm, at least part time. Most of these have found employment in the industrial plants within the surrounding area (Mendenhall, Magee, Mt. Olive, Collins, Laurel, and Hattiesburg).

The farms which employ as much as one and one-half man-years of hired labor are in the minority and their operations comprise a very small percent of the bottom land area as compared to the family type farm operation.

The average per capita income for the people of the watershed was $2,130 in 1969 as compared with the national average of $3,416. Thus the income of people within this area is only 62 percent of the income of people nationwide.

Numerous county roads; State Highways 28, 35, 532, 541, 581, and 590; U. S. Highways 49 and 84; and a branch of the Illinois Central Railroad provide easy access to nearby markets and business areas. The Collins Airport is located just at the edge of Collins, Mississippi, and in the Okatoma Creek flood plain. The Illinois Central Railroad runs along the west side and U. S. Highway 84 is 500 feet to the south. The landing strip is sod (bermuda grass) and about 3,800 feet by 250 feet. There are facilities for refueling and minor repairs. The towns of Magee, Mt. Olive, Collins and Seminary and the communities of Martinville, Maddox, Coats, Arbo, Ora, Kola, Sanford, Smith, Cyclone and Lux serve as centers of economic, social and cultural activities for watershed residents.

The opportunity of promoting the Comprehensive Overall Economic Development Programs for Covington, Simpson, and Smith Counties, as prepared by the Rural Area Development Committee within these counties, will be enhanced since the objectives of the watershed plan will incorporate many of the agricultural and recreational objectives (cropland, pasture land, forest land, watershed, planned recreation and wildlife) of the RAD plan of works.

Fish and Wildlife Resources

Fishery and wildlife resources within the watershed range from good to excellent. The lower section of Okatoma Creek provides good populations of both fish and wildlife, while the headwater areas of the watershed provide good upland game habitat.

The shape of the watershed is unique. Eighteen major tributaries, comparative in size, enter the main stream at regular intervals throughout the watershed, contributing to a rather even distribution of stream flow. This results in a stream fishery of significant quality on Okatoma Creek from its junction with Bowie Creek upstream to its confluence with Goodwater Creek. Six of the lower watershed tributary streams are also fished in varying degrees.

The following table shows the results of two fish population studies made on Okatoma Creek on June 12, and July 22, 1968, by the Mississippi Game and Fish Commission with assistance from the Soil Conservation Service biologist.

Unit	Upper Study		Lower Study	
Date of Study	June 12, 1968		July 22, 1968	
Location	3.5 miles upstream from Highway 84 at Collins		1.5 miles upstream from the bridge at Lux	
Water Temperature	75.0°F		88.0°	
Average Depth	4.0 feet		2.4 feet	
Maximum Depth	8.0 feet		5.5 feet	
Area	0.34 surface acres		0.43 surface acres	
Material Used	3 pints 5 percent Noxfish 12 pounds $KMNO_4$		3 pints 5 percent Noxfish 12 pounds $KMNO_4$	
Species	Number	Weight (lbs)	Number	Weight
Blacktail Redhorse	32	15.9	35	15.2
Channel Catfish	12	7.3	48	17.7
Bluegill	22	2.0	52	3.7
Flathead Catfish	2	3.8	9	53.2
Spotted Bass	4	1.5	63	5.4
Largemouth Bass	5	1.4	15	2.4
Longear Sunfish	24	1.0	41	2.6
Rock Bass	4	0.7	22	2.1
Misc. Minnows	64	0.6	222	3.9
Northern Hogsucker	1	0.5	8	2.2
Pickeral	2	0.3		
American Eel	3	0.2		
Gizzard Shad	1	0.2	31	13.4
Misc. Madtoms	19	0.1	3	.T
Misc. Darter	21	0.1	11	0.2
Warmouth	1	0.1		
Green Sunfish	8	0.1		
Pirate Perch	3	.T		
Gambusia	2	.T		
Golden Redhorse			8	17.8
Quillback			14	9.9
Striped Mullet			4	6.9
Smallmouth Buffalo			1	2.0
White Crappie			3	0.7
W. Spotted Sunfish			17	0.7
Spotted Sucker			3	0.6
Redear			3	0.5
Skipjack Herring			1	0.1
TOTALS	(19) 230	35.8	(22) 618	161.2

The weight of the upper study expands to 105.2 pounds per acre with game fish composing 52 percent of the number of species, 36 percent of the total number of fish and 50 percent of total weight. The lower study expands to 374.8 pounds per acre with game fish composing 45 percent of the species, 44 percent of the total number of fish and 55 percent of the total weight.

An estimated 9,800 man-hours per year are spent in fishing Okatoma streams. About 60 percent is for catfishing, 10 percent for bass, redhorse, sucker and buffalo, 18 percent for bream, and the remainder for crappie or other fish. The lower portion of Okatoma from Seminary downstream including tributaries receives about 55 percent of the total fishing pressure. The area from Seminary north to Collins, including tributaries, receives about 25 percent of the pressure, and the Magee area receives about 15 percent. Headwater areas receive the remainder of the fishing pressure. All tributaries constitute less than five percent of total fishing pressure.

Additional fish collecting has been done in the Okatoma Creek Watershed to obtain further information about species diversity. Seining in eight locations on the Okatoma main stem and major tributaries revealed new species not encountered or identified from the two 1968 fish population samples on the Okatoma main stem. A composite list of the species collected in 1968 and 1975, which follows, includes no endangered and threatened species according to the U. S. List of Endangered Fauna or Mississippi's List of Endangered and Threatened Vertebrates.

Total Species List from 1975 Seining and 1968 Fish Population Samples

Anguilla rostrata	American eel
Dorosoma cepedianum	Gizzard shad
Alosa chrysochloris	Shipjack herring
Esox sp.	Pickerel
Pimephales notatus	Bluntnose minnow
Notemigonus chrysoleucas	Golden shiner
Hybopsis winchelli	Clear chub
Hybopsis aestivalis	Speckled chub
Opsopoeodus emilae	Pugnose minnow
Hybognathus nuchalis	Silvery minnow
Notropis venustus	Blacktail shiner
Notropis longirostris	Longnose shiner
Notropis baileyi	Rough shiner
Notropis texanus	Weed shiner
Notropis chrysocephalus	Striped shiner
Notropis roseipinnis	Cherryfin shiner
Carpiodes cyprinus	Quillback
Ictiobus bubalus	Smallmouth buffalo
Moxostoma poecilurum	Blacktail redhorse
Moxostoma erythrurum	Golden redhorse
Hypentelium nigricans	Northern hogsucker
Minytrema melanops	Spotted sucker
Ictalurus punctatus	Channel catfish
Pylodictus olivaris	Flathead catfish

Continued

Noturus funebris	Black madtom
Noturus leptacanthus	Speckled madtom
Noturus gyrinus	Tadpole madtom
Aphredoderus sayanus	Pirate perch
Fundulus olivaceus	Blackspotted topminnow
Fundulus nottii	Starhead topminnow
Gambusia affinis	Mosquitofish
Labidesthes sicculus	Brook silverside
Lepomis macrochirus	Bluegill
Lepomis microlophus	Redear
Lepomis punctatus	Spotted sunfish
Lepomis cyanellus	Green sunfish
Lepomis megalotis	Longear sunfish
Chaenobryttus gulosus	Warmouth
Ambloplites rupestris	Rock bass
Micropterus punctulatus	Spotted bass
Micropterus salmoides	Largemouth bass
Pomoxis annularis	White crappie
Ammocrypta beani	Naked sand darter
Ammocrypta vivax	Scaly sand darter
Percina sciera	Dusky darter
Percina nigrofasciata	Blackbanded darter
Percina uranidea	Stargazing darter
Etheostoma proeliare	Cypress darter
Etheostoma nigrum	Johnny darter
Etheostoma stigmaeum	Speckled darter
Etheostoma swaini	Gulf darter
Etheostoma whipplii	Redfin darter
Etheostoma zonale	Banded darter
Etheostoma histrio	Harlequin darter
Mugil cephalus	Striped mullet

Habitat for small game, quail, rabbits and doves is good to excellent and is about evenly distributed throughout the watershed. Deer, turkey and squirrel habitat in the Okatoma bottom may be considered some of the best in the state. Deer are found in good numbers throughout the watershed and are increasing. Turkeys are found in Okatoma bottom between Mt. Olive and Collins and below Seminary.

Beaver activity is present throughout the watershed. In the area north of Highway 28, beaver have contributed to flooding of open land. In the wooded areas along Okatoma proper and some of its tributaries, beaver ponds provide wood duck habitat and are also fished to some extent.

The estimated 3280 acres of swamp land located mostly along the tributary streams in the lower two-thirds of the watershed could be classified as Type III, IV or VII wetlands, as classified by Cirular 39, Wetlands of the United States, Department of the Interior, Fish and Wildlife Service. Also, there are about 7700 acres of capability class IVw1 land scattered throughout the flood plain area that could be classed as Type I wetland because of receiving occasional overflow and having a high water table for long periods during the year.

Public access to the hunting and fishing potential is limited. There are several access points to Okatoma Creek for fishing, mostly at road crossings. Many of the landowners allow open hunting on their property. Others allow hunting by invitation only and a few do not allow hunting of any kind.

Recreational Resources

The major water based recreational facility now existent in the watershed is Legion Lake, a 25-surface acre lake located on a tributary to Shelby Creek about three miles east of Mt. Olive. Facilities for picnicking and fishing are available.

The Mississippi Game and Fish Commission's Lake Mike Conner has an 88-acre water surface and has a concession stand, rest rooms, concrete boat launching ramp, swimming area, picnic tables and an overnight camping area with electrical and water hook ups. In 1972 fishing permits in the amount of 4,365 were sold to fishermen. No records were kept of the other activities but the numbers were fairly large. This lake is located about eight miles west of Collins and just outside the watershed.

The Mississippi Game and Fish Commission operates the Simpson County Legion Lake which has a 94-acre surface area. Facilities include a concession stand, rest rooms, boat launching ramp, picnic tables, swimming area, and a camping area. In 1972, 7,382 people purchased fishing permits. No records were kept of the other activity occasions but they were substantial. This lake is located about five miles north of Magee on U. S. Highway No. 49 and is just across the watershed divide.

Archeological and Historical Values and Unique Scenic Areas

Within the lower 10 to 12 miles of Okatoma Creek, particularly in the Seminary area, there are some small rock overfalls which are of unique scenic value in an area of almost no occurrences of this nature. McNair Spring, in the Magee area, has a flow of about 450 gallons per minute and a temperature of 56° F, year-round. This spring is in a scenic setting of tall stately pines and is unique for this vicinity.

An archeological survey in the Okatoma Creek Watershed with particular emphasis in the areas affected by the proposed structural works was completed by the Mississippi Department of Archives and History. The Director of this department is the State Historic Preservation Officer. Some six archeological sites were located in the watershed area. These sites are recorded as sites 22-Cv-501, 502, and 503; sites 22-Sm-505; and sites 22-Si-508 and 509. The above listed sites represent a considerable time span of occupation. Though the area was used by prehistoric people for a great length of time, activity was not intense. No permanent stratified sites were recorded and all of the sites are considered hunting camps. Lithic debris and artifacts are abundant on most sites indicating that the occupants engaged in toolmaking activities, probably associated with hunting deer and other game. None of the above-mentioned sites are

considered as candidates for National Register application. The report states and a search of the latest National Register publication indicates that there are no National Register sites within the watershed area.

Soil, Water and Plant Management Status

The overall trends in land use of the past thirty years have been away from cropland and toward pastureland and forest land. A combination of frequent flooding, rising operating costs, shortage of labor, and small operations has caused a large part of the cultivatable bottom lands to be converted to other uses.

Expanded livestock enterprises, particularly the large influx of poultry production, appears to be modifying the trend toward forest land. There are two possible reasons for this. First, there is a need for cleared land on which to dispose of chicken house wastes and second, profits from chicken operations are providing capital necessary for expansion. The chicken house waste disposal is actually organic fertilizer applied to improved pasture that has been converted from other uses and accounts for a minor percent of the watershed.

With an increased interest in growing soybeans as a cash crop and the need for additional feed crops as livestock operations expand, some of the formerly cleared bottom lands are being cleared for cropland either by renters or by some of the larger farm operations. Based on the capability of the soils in the bottom lands and with reduced flooding, the potential is good for developing and restoring these lands for the growing of locally adapted crops and pasture grasses.

The on-going land treatment program through the federal, state, and local agencies has had a significant effect in reducing the erosion rate and providing adequate cover. The watershed is in an area where a large number of upland acres were in cultivation in the 1930's. A large terracing program was carried on by the Vocation Agriculture departments of the high schools, the county agents and the Soil Conservation Service during this period, which remained an effective deterent to erosion through the period that mule-type farming existed. Under today's conditions of tractor farming with multi-row equipment, there are too many acres of cultivation of erosion prone IVe, VIe and VIIe lands. Also, there are a large number of cultivated acres of IIIe lands. The commitment of land, labor and capital to cultivation on these lands leads to inefficient use of these production factors. The same inefficient use of production factors exists when there is commitment to their use on bottom land because of the frequent flooding.

Soil and Water Conservation districts cover the entire watershed area. These districts have been active for a long period of time. There are now 381 active cooperators with conservation plans in effect. These 381 active cooperators have established about 60 percent of the planned practices. There is about 80 percent of the watershed area covered by active conservation plans.

About two-thirds of the 381 active cooperators, as mentioned above, have forest management plans with the Mississippi Forestry Commission or forest management input in the conservation plan. About 20 percent of the forested watershed acres are covered by forest management plans or forest management input.

The Pat Harrison Waterway District is operating a program of assisting local groups in the carrying out of needed land and water resource development projects (for example--boat launching ramps, water parks, etc.). A recent RC&D project has begun in Southeast Mississippi that will cover the watershed area. There has been a Comprehensive River Basin Study in the Pascagoula River Basin. In that study, this watershed was recommended as an early action upstream watershed project. This project along with projects of other agencies was chosen as the needed project developments for the overall good of the sub-region.

WATER AND RELATED LAND RESOURCE PROBLEMS

Land Management Problems

The land of the watershed has specific problems some of which are related to the land itself and some of which are related to treatment and use of the land, past and present. There are about 6,200 acres of loamy sands and gravelly loamy sands on 12 to 40 percent slopes in the upland areas of Covington and Simpson Counties which are somewhat excessively drained and have low fertility and organic matter. Although there is no particular erosion problem on these soils, it is difficult to establish and maintain a cover. Pine or other adapted forest types appear to be the best use. Most of these soils are now forested; however, about 10 to 12 percent are cropped, pastured or idle. This 10 to 12 percent should be converted to forest.

There are some 802 acres of gullied lands within the watershed (mostly in the uplands of Covington and Simpson Counties) where the soil has eroded to the extent that little or no cover can be maintained. There are an additional 8,000 acres of lands on 12 to 40 percent slopes and 35,000 acres on 8 to 17 percent slopes that are slightly to severely eroded. The steeper of these lands are located in upland areas of Covington and Simpson Counties and the less hilly portion occurs as scattered areas throughout the watershed upland. About one-fifth of these areas are in crops, pasture or idle and need very special handling or conversion to forest. Trends in land use in such areas are already underway to replace cultivation with permanent vegetation (pasture and forest). An acceleration of these land use adjustments is needed, however, for the protection of the remaining soil resource.

Many areas within the watershed exist where the committed factors of production are inefficiently utilized. Landowners, because of marginal returns on uplands, and damages and/or under investment of production factors on bottom land, have not achieved an economic level whereby many needed land treatment measures can be installed. Also they have not reached the economic level whereby they could use the land up to the limits of its capability especially in the bottom lands and the more level uplands.

All of the forest measures and efforts are somewhat inhibited by a high fire occurrence rate. The 1971 state fire loss index goal was 0.25 percent. The average burn rate for 1963-1971 was 0.26 percent. This exceeds the small watershed goal of 0.20 percent. The trend is for improvement, but needs acceleration.

Floodwater Damages

There are 37,210 acres of flood plain land in the watershed. This land has a current average value of about $200 to $300 per acre. Seven hundred and forty four farms receive flood damages to pastures, crops and fixed improvements such as fences, field ditches and roads. County and state roads and bridges, utilities and railroads also receive flood damages. Property within the towns of Mt. Olive, Collins and Seminary and the village of Sanford receive damages. Urban damages are incurred

on 73 residences, an airport, a school, five churches and 21 small businesses. Average annual floodwater damages are estimated to be $570,700, of which $370,300 is agricultural damage and $200,400 is non-agricultural.

Watershed-wide damaging floods occur on the average from 3 to 6 times per year. Floods occur during the crop growing season on an average from 3 to 5 times per year. This flooding has caused considerable acreage of the flood plain to be abandoned from cultivation.

Flooding is less frequent along the lower reach of the main stem from about Seminary to the outlet. This is due to the relatively large capacity of the existing channel. Flooding occurs in this reach on the average of about once every four years. Along the main stem reach between Kola and Seminary, flooding occurs on the average of once every two years.

In the main Okatoma reach between Kola and the Okatoma-Blackely Creek junction, flooding averages about three times per year. In the main Okatoma reach between the Okatoma-Blackely Creek junction up to Floodwater Retarding Structure No. 17, flood occurrences will average about five times per year. There is some variation in the frequency of flooding along the tributary flood plains. However, flooding occurs on the average of six times per year or more.

The frequency of flooding and the resultant damages are expected to increase in the future unless provisions are made to reverse filling and loss of channel capacity due to siltation, debris and other obstructions. The main Okatoma channel from about Kola upstream to the headwaters is filling with sediment, debris and vegetative obstructions. This filling and obstruction is resulting in decreased capacity which will result in more frequent and higher flood stages along that reach of the stream. Practically all of the tributary streams are filling in the same manner as the upper two-thirds of Okatoma Creek. Some streams have already filled to the point that flood plain land swamping is present. An estimated 3,280 acres, mostly along the tributary streams in the lower two-thirds of the watershed, are now swamped out.

Frequent spring and summer floods delay land preparation, planting, and cultivation. Floods that occur after normal planting time make repreparation and replanting necessary. Uneven crop stands are obtained, increased costs of production are incurred, and reduced crop yields result.

The greater agricultural damages occur as a result of the smaller more frequent spring and summer floods rather than the larger winter and early spring floods. Floods during the pasture growing season deposit silt on the leaves making the pasture undesirable for grazing. Floods of sufficient duration at certain times of the year will kill the grasses and/or clovers making pasture re-establishment necessary. Grazing values are lost until the pasture is re-established.

The soils of the flooded areas are in land capability Classes IIw, 22 percent; IIIw, 30 percent; and IVw, 48 percent. The flood plain areas could be used to a greater degree for cultivated crops and pastures if it were not for the existing flood hazard.

The land use within the flood plain area is shown by reaches in the following table.

Land Use of Flood Plain lands

Location	Acres	Land Use (Percentage)			
		Crops	Pasture	Misc.	Forest
Main Okatoma from outlet up to Seminary	4,555	11	19	2	68
Main Okatoma from Seminary up to about Kola	1,673	6	13	6	75
Main Okatoma from about Kola up to Okatoma-Blackely Creek jct.	1,725	6	13	4	77
Main Okatoma from Okatoma-Blackely Creek junction up to FWRS-17	7,579	2	11	2	85
Above FWRS-17 up to FWRS's 14 and 16	1,301	3	42	2	53
All other tributary streams, uncontrolled and above structures	20,377	1	28	3	68

Flooding has caused damages to roads and bridges throughout the flood plain. The greater damages to the fixed improvements are caused by the larger floods. There has been no recent loss of life as a direct result of flooding.

The damages to residential and commercial property from floodwater are not as frequent as other types of damages due to their relative position within the flood plain. The flooding of the Collins Airport results in damage to planes left on the field, extra work and cost in moving and storing planes at other airports, flooding of the refueling and repair facilities, and disruption of air traffic.

The area of the Mill Creek flood plain within the town of Magee has ponded, stagnant water and water tolerant vegetation near residential areas. This area of the flood plain is unsightly, provides excellent vector habitat and reduces the quality of living. There is flooding of yards, septic tanks, sewer lines and some streets. Although monetary damages are not large, these conditions result in significant degradation of the environment.

Flooding in the watershed results in many low-lying areas being filled with water. When the floods recede, some of these areas do not drain leaving excellent vector habitat, which in turn creates discomfort and health

hazards for all nearby people of the watershed. The lives of the people are affected in another way in that the flood losses and restriction to economic gains reduce income and quality of life.

The flood of February, 1961, within the Okatoma Creek Watershed, was one of the most disastrous flood events that has happened in this area within recent years. On February 17, seven to nine inches of precipitation fell in an area from Bogalusa, Louisiana, northeastward through Purvis, Hattiesburg and Shubuta, Mississippi. This line of extremely heavy rainfall was slightly south of the Okatoma Creek Watershed. Less rain fell within the watershed area, varying from some two to four inches. During the period of February 18 through 20, following this heavy burst, one to three more inches of rain fell steadily over a much wider area, so that a total of about six to ten inches of rain fell in and around the Okatoma Creek Watershed. Then, on February 21-22, as much as eight inches of rain fell in a band generally parallel to the February 17 storm line but some 50 to 100 miles to the north of it. This second band extended from Amite, Louisiana, through Columbia, Collins, and Meridian, Mississippi.

The U. S. Weather Bureau rainfall gaging station at Collins showed an accumulated total of 12.47 inches of rain during the five-day period, February 17-22, with some 7.13 inches recorded on February 22. Other nearby stations recorded from approximately three inches to more than eight inches of rainfall on this same date.

As a result of this tremendous amount of rainfall, peak runoff discharges within the area caused extensive flooding. On Bowie Creek at Highway No. 49, a peak discharge of 34,800 cubic feet per second (cfs) was recorded as compared to the 50-year flood peak discharge of 27,000 cfs. Leaf River, at Highway No. 84 east of Collins, had a recorded discharge of about 48,500 cfs, which is a little greater than the 50-year flood peak discharge of 46,000 cfs. This flood was the greatest flood of record since 1900 and approximately equaled that historic event. On Okatoma Creek, at Highway No. 28 east of Magee, the estimated peak discharge of 9,000 cfs was greater than the 50-year flood peak discharge of about 8,500 cfs. At Highway No. 590 at Seminary, the peak discharge of 18,200 cfs was less than the 50-year flood peak discharge which is about 22,000 cfs.

From information furnished by the Illinois Central Railroad Company, floodwaters covered the tracks in many places up to a depth of several feet. At Lux, water covered the tracks approximately 0.8 feet; about a mile above Seminary, approximately 2.0 feet; at Kola, approximately 1.7 feet; one-fourth mile above Collins, about 1.5 feet; at Leonards Mill Creek, about one mile below Mt. Olive, approximately 0.9 feet; and from Mt. Olive to Saratoga, from 0.2 to 0.3 feet.

Many bridges and roads were over-topped by flood waters to a depth of several feet. Highway No. 28, for example, was inundated some 1.3 feet. The county road bridge at Coats was more than 2 feet under water and Highway No. 84 bridge at Collins was more than one foot under. The road crossings at Kola, Seminary, Sanford, and Lux all were covered.

Local residents described the flood as being from "hill to hill". An estimated 37,200 acres of bottom lands were inundated. However, since this flood was an "off-season" event, damage to growing crops was relatively light. Some scouring occurred and silt was deposited on pasture grasses. Many livestock were swept away and drowned. Damages to the fixed type of improvements such as fences, bridges, roads, railroads, residential and commercial properties within the watershed amounted to an estimated $141,605 under 1961 conditions. Although no persons in the Okatoma Creek Watershed were drowned, there were three lives lost in Hattiesburg as a result of this flood.

During the planning phase record floods occurred in the Okatoma Creek basin. In April 1974 as much as 20 inches of rainfall occurred, mostly in a 30-hour period on April 12-13. Recorded rainfall totals include 20.78 inches near Sanitorium, Mississippi, and 20.36 near Magee, Mississippi. Flood discharges at two sites on Okatoma Creek near Magee (drainage area 24 and 38 square miles) were two times the expected 50-year flood. Okatoma Creek at Seminary, Mississippi, had a peak discharge of 31,000 cfs which is 1.4 times the 22,000 cfs 50-year flood.

Erosion Damage

There are approximately 136,888 acres of Classes IIe, IIIe, IVe, VIe, and VIIe lands in the watershed. Of this total, 13,928 acres are in cultivation, 2864 acres are idle, 40,841 acres are in pasture and perennials, and 74,255 acres are forested. Sheet erosion is slight to moderate. Gully erosion is active on 802 acres. Bare roadbanks along 279 miles (one side) of roads are eroding and have caused filling of channels, road ditches and culverts. Some scour damage occurs on the flood plain as a result of the frequency of overflows. However, it is limited in scope and does not generally hinder cultivation.

Land use adjustments are needed on the steeper more eroded areas that are scattered throughout the watershed. There is an estimated 764 acres of cultivation on Capability Class VII land. This land is better suited for forest and/or wildlife. In addition, there is an estimated 1,946 acres of pasture on this Class VII lands that will have to be very carefully managed if adequate cover is to be maintained. Factors of production could be expended more efficiently on less steep lands that are better suited to pasture production. There are an estimated 538 acres of cultivation and 7,179 acres of pasture on Class VI lands. These lands also require intensive management for the maintenance of an adequate cover. Cultivated areas should be converted to permanent vegetation. In addition there are 3,967 acres of cultivation and 13,368 acres of pastures occupying Class IIIe and IVe lands. The cultivated areas in particular will have to be managed carefully so as to prevent erosion and damage to the land itself.

The gross erosion rate for the entire watershed is 10.7 tons per acre per year. For upland cropland the gross erosion rate ranges from 27.6 to 63.6 tons, upland pastures from 5.1 to 15.9 tons, upland forest land from 1.4 to 3.9 tons, and upland miscellaneous lands from 3.9 to 11.6 tons.

Bottom land areas are not considered to be contributing areas.

The general effect of erosion on the agricultural production is to decrease per acre yields and to increase the cost of production. The upland yields are decreased through loss of fertility. Production costs are increased by requiring more fertilizer to be used in achieving a given yield and by the cost associated with application of land treatment measures necessary to maintain agricultural production.

Sediment Damage

Roadside erosion and erosion in the upland areas have resulted in moderate to severe siltation in most of the stream channels. Sediment has caused channel fill and deposition from overbank flooding. Sediment damages were evaluated as an increasing flood damage over time resulting from the loss of channel capacity.

The entire flood plain area has received some sediment deposition. The extent of damage resulting from this deposition ranges from almost none up to about 45 percent damage. The equivalent of all sediment damage is about 8,070 acres damaged 100 percent. This indicates that the average damage for all of the flood plain acres would be about 21 percent.

Sediment deposition in the stream channels is causing loss of channel capacity particularly in the upper two-thirds of main Okatoma, the extreme lower reach of main Okatoma from Lux downstream and the tributary streams. This decreasing channel capacity has and is continuing to result in a worsening flood problem. Should this continue unchecked, most current agricultural use with the exception of water tolerant plant species will be eliminated from the affected flood plain.

The present sedimentation rate will fill the on-farm surface field ditches in the bottom land area in a short period of time unless they are maintained every year or two. Sediment has filled many roadside drainage ditches, resulting in the flooding of roads and excess maintenance costs for roads and roadside ditches.

The present sediment yield in Okatoma Creek at the lower boundary of the watershed is estimated to be approximately 394,000 tons per year. This sediment creates downstream problems of maintaining channel capacity, keeping the water clean for beneficial uses, flood plain sedimentation, and keeping the navigable rivers and harbors open.

Recreation

The water quality of the streams, farm ponds and of Legion Lake is, on the whole, good. There are some specific areas below broiler or laying chicken houses that would not be desirable for water contact sports. The water in many of the streams and ponds has a fairly high degree of turbidity due to suspended sediment. This turbid condition exists for most portions of the year.

Recreational areas and facilities within the watershed are limited to those previously described in the "Environmental Setting" section. The need for additional areas and facilities for the general public is based on data obtained from the Mississippi Statewide Comprehensive Outdoor Recreation Plan, Fourth Edition. Data from the Central, East Central, and Southern Mississippi (North) Planning Districts indicate needs by 1980 for 2864 camping units, 16,973 picnicking units, 8,592 acres of water surface for boating, and 125 acres of water surface for swimming, along with adjacent sand beaches. By 1990 the needs are estimated to be 5,325 camping units, 26,046 picnicking units, 27,853 surface acres of water for boating, and 216 surface acres of water for swimming, along with adjacent sand beaches.

The present estimated population is 242,400 people within a 50-mile radius of the watershed. The watershed sponsors are very interested in developing recreational areas and facilities as a part of this project.

Fish and Wildlife

Sedimentation of stream channels has reduced the quality and quantity of the fishery resource in the extreme lower end of main Okatoma Creek from the vicinity of Lux to the outlet, in the upper one-half of main Okatoma, and on several of the upper-end tributary streams.

There is a need for additional lake-type fishery habitat even though there are two fine Mississippi Game and Fish Commission lakes located just outside the watershed boundary. Appendix I of the Pascagoula River Comprehensive Basin Study indicates that in the Leaf River portion of the basin that there will be an unsatisfied demand (need) for 185,000 man-days of fresh water fishing by 1980 and 586,000 by the year 2015.

Economic and Social

Of the approximately 1,433 farms in the watershed, 67 percent or over 940 sold less than $2,500 worth of farm products in 1969. Low income is a real problem with the people of the watershed area. A measure of this low income is the fact that the average per capita income in 1969 was only $2,130 or 62 percent of the national average of $3,416. Another indication of low farm income and economic depression is the fact that about 53 percent of the farm operators work at off-farm jobs at least part-time.

The farm operations in this watershed are, in the main, family-farm enterprises. For these farms to remain in business, there is a need for developing the agricultural production potential of the area. There is a need for developing a better rural community life in this area. Most of these people are farmers and are not equipped to provide for themselves away from the farm. An improved agriculture and improved quality of life will allow many people to remain self-sustaining.

Other

There is a need for additional farm ponds to facilitate better management of pastures. Adequate moisture for the production of crops commonly grown in the area is available from normal rainfall. No project action is needed at this time to provide additional sources of water for irrigation.

Some channel improvement work has been completed and provides sufficient capacity to meet the drainage needs for the areas they serve. There are no high water tables or seepage problems. The efforts of the local people, through individual on-farm land treatment and individual and group conservation engineering practices, have not been sufficient to solve the floodwater and sediment problems.

ENVIRONMENTAL IMPACTS

Conservation Land Treatment: The installation of the conservation land treatment measures and stabilization of the critically eroding areas will effect a decrease in watershed erosion. This decrease will amount to a reduction in gross erosion of about 28 percent (from 10.7 tons per acre per year to 7.7 tons) and about 68 percent in monetary damages. The reduction in erosion through land treatment along with the sediment trap capability of the floodwater retarding and multiple purpose structures will reduce the amount of sediment available for overbank deposition, for deposition in the stream channels and ditches, for downstream deposition and for causing turbidity in the streams of the watershed and downstream. Since sediment is the major source by which agricultural pesticides, herbicides and nutrients enter lakes and/or stream systems,1/ the reduction of sediment will reduce the levels of agricultural pesticides, herbicides, and nutrients entering the lakes or streams under present application amounts and procedures.

The planned conservation land treatment, land use and critical area stabilization will improve the hydrologic characteristics of the soil allowing for greater water infiltration and soil moisture holding capabilities.

The improved cover conditions, the wildlife food plantings, the wildlife habitat preservation, and the establishment of vegetative cover on critical areas will increase and improve habitat suitable for wildlife. With the improvement of wildlife habitat, it is expected that there will be a corresponding improvement in the wildlife resources.

The improved cover condition, the covering of bare and gullied areas with vegetation, the construction of ponds, and the improved pastures will enhance the esthetic values of the rural countryside.

Structural Measures: Structural measures in conjunction with land treatment will reduce the sediment leaving the watershed by 56 percent, from about 394,000 tons per year down to about 172,000 tons per year. Economic losses resulting from over bank sediment deposition will be reduced by about 52 percent within the watershed area. There will be a decrease in average sediment concentration in the water leaving the watershed by about 605 mg/l, from a present 1,075 mg/l to a future 470 mg/l. Of course, most of the sediment moves during high flows with resultant higher concentration during high flows and lower concentrations during low flows.

The floodwater retarding structures, the multiple purpose structure, and channel work will effect a reduction in the frequency and depth of flooding. Flood plain areas affected include the entire Okatoma Creek flood plain from Floodwater Retarding Structure No. 17 downstream to Bowie River, the flood plain area above the Floodwater Retarding Structure No. 17 sediment pool up to Floodwater Retarding Structures Nos. 14 and 16, and the

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1/ Minutes of ARS-SCS Workshop on Pollution, June 22-24, 1971, USDA Sedimentation Laboratory, Oxford, Mississippi. Papers by Rausch, McDowell, S. J. Smith, and G. D. Smith, all of ARS.

tributary flood plains below Floodwater Retarding Structures Nos. 19, 12, 10, 18, 9, 3, 8, 1, 7, 6, 2, and 5. There are about 18,667 acres in these flood plain areas.

The depth of flooding reduction along Okatoma Creek for the larger storms are about one-half foot at the lower end, about one and one-half feet at Seminary, about two feet at Collins, about one and one-half feet at Mt. Olive and about three and one-half feet below Floodwater Retarding Structure No. 17. In this area, there will be about 7,700 acres protected to the degree so that the growing of crops would be reasonably safe and about 9,275 acres (including the above 7,700 acres) that could reasonably be used for pastures.

All tributary flood plain areas to Okatoma main stem below planned floodwater retarding structures will realize significant flood reductions. The flood depth reduction for the larger storms will range from about one-half foot to about three or four feet depending on proximity to floodwater retarding structures and degree of channel work performed, if any. In these tributary areas, there will be about 2,212 acres reasonably safe for crops and about 2,900 acres reasonably safe for pastures.

The effects of the project on the urban-type flooding at Mt. Olive, Collins, Seminary and Sanford are illustrated in the following table:

Project Effects on Urban-Type Flooding

Location	Flood Reduction							
	100-Year Frequency		Within Building Flooding 1/					Average Annual Damages
	Peak Discharge (Percent)	Stage (Ft)	Houses (No.)	Businesses (No.)	Airport (No.)	Churches (No.)	School (No.)	(Percent)
Mt. Olive	33	1.4	22	5	0	2	0	46
Collins	34	1.7	6	6	1	0	0	79
Seminary	34	1.3	12	3	0	0	0	51
Sanford	21	1.3	15	7	0	0	1	27

1/ There are 18 additional residential properties and three churches receiving damages to lawns, grounds and foundations which will also benefit from flood reductions.

Damage reductions by percent for selected reaches are summarized in the following table:

Reach Location	Percent Reduction
Main Okatoma from outlet up to Seminary	59
Main Okatoma from Seminary up to about Kola	87
Main Okatoma from Kola up to Okatoma-Blackely Creek junction	85
Main Okatoma from Okatoma-Blackely Creek junction up to FWRS 17	72
Above FWRS 17 up to FWRS's 14 and 16	78
Tributary streams with structural measures	80

The analysis of the stream's waste assimilative capacity through use of the mathematical model for the Pascagoula River Basin under present and project conditions indicated a slight, nonsignificant increase in the water quality under project conditions. The primary change in the waste assimilative capacity would be due to the change in the reaeration rate. The reaeration rate for the Pascagoula River Basin water quality model is based on the O'Connor-Dobbins equation: $K_a = \frac{12.9\ U\ 1/2}{H^{3/2}}$ at 20° C where:

K_a = atmospheric reaeration coefficient
U = fresh water velocity, ft/sec
H = mean water depth, ft.

With project installation, the 7-day, 10-year low flow velocity will increase approximately 41% and the depth will decrease approximately 45% which will increase the reaeration rate, K_a, by 200%. At higher flow, the reaeration rate increase will not be as significant.

Although the reaeration rate increases considerably, the assimilative capacity does not increase significantly because the stream does not receive any major waste loads and the present concentration of oxygen is near saturation.

The land use in the areas of the flood plain directly effected by structural measures under present project conditions is about five percent cropland, 20 percent pastures, 72 percent forest and three percent miscellaneous. With future project conditions, the land use is expected to be ten percent cropland, 28 percent pasture, 59 percent forest and three percent miscellaneous.

The structural measures, particularly planned channel work, will reverse the trend toward channel filling, loss of capacity and increased flood frequency projected in the upper two-thirds of Okatoma Creek and on the tributary streams on which structural measures are planned.

The direct beneficiaries of the flood prevention, erosion reduction and sediment reduction are 591 farm operators, 73 home owners, 21 small businessmen, one airport, five churches and one school. In addition, it is expected that an average of about 112,000 people annually will use the recreation facilities at the two recreation developments.

About 53.7 miles of the 273 miles of channels within the watershed will have altered fishery habitat because of channel work. The effect on the fishery habitat will vary with the intensity of channel work and the present condition of the resource. For description of intensity of work to be accomplished in each channel work class, see "Planned Project" section

Of the 53.7 miles of channel work, 1.9 will be Work Type I, which is the establishment of a new channel. This will be a floodway type or auxiliary type channel in the vicinity of Collins. The old channel will remain and carry all of the flows up to about four feet deep at which the new channel will begin to function also. For flows deeper than four feet, both channels will function. The fishery resource in this reach will not be disturbed since the channel itself will not be disturbed and only the high flow portion of runoff diverted. Bottom land hardwood and wildlife habitat in the amount of 76 acres will be destroyed in this channel work reach.

Of the 53.7 miles of channel work, 9.7 miles will be of Work Type II, which is channel enlargement. Within these areas, it is estimated that the present fishery habitat potential will be reduced to practically none for a period of about one year, after which a gradual recovery will take place. About 50 percent of the fishery potential should be recovered in a 10-year period. After the 10-year period, there will continue to be a gradual recovery in the fishery resource. It is likely that reduced fishery yields will result in channel sections where Type II channel work occurs as long as a maintenance program is continued.

About 10.2 miles of stream channels will be modified according to Work Type III, which is clearing and shaping. The accomplishment of this channel work will reduce the present stream fishery potential by about 75 percent for a period of about one year. The stream fishery potential will recover to a level estimated at 75 percent of present condition in about five years. After five years, there will continue to be a gradual recovery in the fishery resource.

The remaining 31.9 miles, of the 53.7 miles of channel work, will require clearing only (Work Type IV) for the attainment of sufficient water carrying capacity. Since the vegetation will be removed in such a way as to disturb bank stability as little as possible, the stream fishery resource will be reduced by about 40 percent for a period of three months

to one year. After this, recovery to about 80 percent of present conditions will occur in about three years. Following this period, there will continue to be a gradual increase in the fishery resource.

The remaining 217.3 miles of the 273 total miles of streams will not have changed characteristics as a direct result of project action. There are 23 miles of main Okatoma Creek that will be below the channel work. This reach of the stream has a chance of receiving turbid water and increased sediment during construction, if high flows should occur during construction or before revegetation.

Installation of land treatment measures and construction of floodwater retarding structures prior to channel improvement will reduce the sediment yield from the watershed from a present average annual rate of approximately 1,075 mg/l to an average annual rate of approximately 470 mg/l. The turbid water and increased sediment during construction of the channels will be for a short period of time and will be only slightly higher than 470 mg/l, which is less than present conditions.

The project impact in reducing erosion and sediment rates, except during the construction period, will have the effect of making the waters of lakes, ponds, and streams less turbid and therefore more attractive for fish and recreation. The reduction of erosion resulting from more ground cover will provide better wildlife habitat. The reduction in sedimentation will prolong the life of lakes, ponds, and reservoirs.

The project as a whole will reduce overbank flooding. This will in turn have a detrimental effect on wetland species of wildlife. Presently waterfowl utilize the flooded woodlands adjacent to Okatoma Creek during periods of occasional inundation. The mast produced from these forested areas becomes covered with from six inches to a foot of water and provides potential food sources for wintering waterfowl. The loss of streambank cover on the 9.7 miles of Type II channel will reduce fur bearer habitat. The increased channel capacity in these sections will increase the possibility of drainage in adjacent areas. The effect on fur bearers in these sections will be detrimental because of the removal of cover and water which are essential in their habitat requirements.

There will be changes in land use and cover (vegetative and water) as a result of project action. Within the future sediment pool areas of the 14 floodwater retarding structures, there are presently 1,104 acres of forest (mostly pine-hardwood) and 444 acres of open land (mostly pastures). The lake fishery resource and waterfowl habitat will be increased by the covering of this 1,548 acres of land with water. The forest land wildlife habitat will be decreased by 1,104 acres of pine-hardwood and the open land wildlife habitat will be decreased by the taking of 444 acres of pastures, idle and cropland. There will be 88 acres of forest land (hardwood and pine-hardwood) cleared for the location of the dams and spillways for the floodwater retarding structures which will result in a reduction of 88 acres of forest land wildlife habitat and the addition of 88 acres of open land wildlife habitat.

At Multiple Purpose Structure No. 1, the addition of 275 acres of water will provide fish and waterfowl habitat. However, there will be a resultant loss of 259 acres of forest land habitat (hardwood and pine-hardwood) and 16 acres of open land wildlife habitat. In the construction of the dam and spillways, there will be a conversion of 7 acres of forest land wildlife habitat (hardwood-pine) to open land wildlife habitat.

In the rights-of-way for channel improvement, which is estimated at 583 acres (47 acres open land and 536 acres of forest land), there will be a conversion of about 158 acres of forest land to open land. This will decrease the forest land wildlife habitat by 158 acres and increase the open land wildlife habitat by 158 acres.

The intensity of right-of-way land clearing through forest land areas will vary according to the Work Type and degree of work to be accomplished. For example; Work Type I, which is new channel, will require that practically all of the right-of-way through the forest area be cleared. For Work Type IV, which is clearing and removal of loose debris, it is estimated that only 40 percent of the right-of-way will have to be cleared for work and disposal areas. By weaving the access road in and out around larger trees and with care in selecting work and disposal areas, the character of the forest will change very little. The land use classification would still be forest. The canopy percentage will decrease only a small amount. Work Type III will have a more intense effect on forest and canopy than Work Type IV, but the land use classification would still be forest. Work Type II will approach Work Type I in the intensity of effect on the forest. However, some selected trees will remain but not enough for the land use classification to be forest.

At the recreation area (Seminary and MP #1) there will be downgrading of 223 acres of forest land habitat and 27 acres of open land habitat because of use by people, congestion, etc.

At the Collins Airport Levee, there will be a conversion of 14 acres of forest land wildlife habitat (hardwood) to open land wildlife habitat.

In the protected flood plain area, there will be about 900 acres of hardwoods cleared for crops and pasture resulting in the loss of this forest land wildlife habitat and the gain in open land wildlife habitat. There will be an additional 1,540 acres of land formerly in crops and pastures that will return to crops and pastures. This land lies mostly in strips of varying widths along the outer edges of the flood plains. As the extent of the outer limits of the flood water is reduced, the protected land can safely return to crops and pastures. Most of this land is now in brush and other timber or idle. The type of wildlife now existing on this land will be lost and open land wildlife habitat gained.

About 1,325 acres of upland crop, pasture and idle lands will be planted to trees (mostly pine and pine-hardwood). The open land wildlife habitat will be lost and forest land habitat (pine and pine-hardwood) will be gained.

The installation of the project will effect an overall estimated reduction of 2,959 acres of bottom land hardwood out of a total 25,310 acres of bottom land forest in the watershed or a 12 percent reduction. This will be a reduction of about one percent as related to the four-county (Covington, Forrest, Simpson and Smith) hardwood timber which is about 379,000 acres.

The installation of the project will effect an increase in upland pine and pine-hardwoods of 52 acres. This increase will be of no significance as related to the total upland forest acreage of the watershed.

The overall availability of resources to the potential user will increase in both quality and quantity. There will be more acres of better managed lakes and ponds for lake fishery and waterfowl habitat. The stream fishery will be reduced in quality and quantity but will be more accessible because of the maintained access roads for channel maintenance. The overall hunting potential will remain about the same with maybe a slight decrease in forest land game and a slight increase in open land game. The recreation resources will be greatly increased in quality, quantity and availability due to the inclusion of recreation facilities at MP Site No. 1 and the Seminary Recreation Area.

There is potential for incidental recreation use at some of the structure measure sites, such as Nos. 2, 5, 7, 16 and 17. However, since public access will not be provided, the Watershed Commissioners will discourage their use for that purpose because of lack of sanitary facilities, possibility of increased maintenance of the flood prevention features, and safety considerations.

There will be no impact resulting from this project on marine life or to any rare or endangered species as now listed for the State of Mississippi.

Use of the recreation facilities included in this project is estimated at about 112,000 people annually. The value per visitor day is about $1.50. A peak daily use by about 4,180 people is expected. The length of the recreation season is the entire year; however, the major season will be the thirteen out-of-school summer weeks. The recreation facilities are designed to accommodate 485 for swimming, 260 for camping, 152 for boating, 213 for fishing, 589 for picnicking and 381 for nature trail hiking. Adequate parking places, water fountains, picnic tables, comfort stations, safety guards and refreshment facilities are provided.

Economic and Social

The overall economy of the area will be boosted by the project action. The added employment as a result of project action will amount to about 270 man-years each year during the construction period. After the construction period is over, it is estimated that 130 man-years of additional employment will be provided each year. This increased employment will tend to lower the unemployment rate which has been consistently high over the past years. This increased employment along with more stability in the farm operation will tend to improve the opportunities so that more people will remain in the watershed area and also, that more people will remain in the rural area. This will lead to retention of more people and more equal distribution of the people retained.

Better agricultural efficiency and income stability can be obtained by the farmers of the watershed in that the crops and pastures can be placed on lands where yields will be higher and more assured. The crops can be moved from the steeper uplands to bottom lands. These uplands can be retired to trees or pastures, reducing erosion and sediment as well as providing a steady source of income.

The quality of living for the beneficiaries of the project will be enhanced through: (1) relief from flooding damages, (2) reduction in agricultural production costs, (3) increase in agricultural yields, (4) reduction of vector habitat, (5) provision for better recreational opportunities, and (6) less interruption of transportation and service facilities. The enhancement in the quality of living will not be limited to the people directly benefited but will be received in part at least by all of the people in and around the watershed.

The rural area will be stabilized in that the people will be afforded a greater opportunity to remain due to increased income necessary for living, which will be generated by the project, and due to the improved quality of life. Their improved income will allow them to maintain their churches, schools, stores, and service facilities necessary to an area's stability. This project will tend to keep an area, that has been strong agriculturally, available for increased agricultural production as needed for the national economy.

Many of the goods and services used by the people of the watershed come from outside the watershed indicating regional influence. Since the project will result in an increased need for goods and services, it stands to reason that there will be an increased demand in goods and services from outside the watershed. There are some unique features, such as the stream overfalls near Seminary, near the recreation development that will induce people region-wide to visit in the watershed area. There is a major north-south highway running alongside the entire length of this watershed. This highway is traveled by many people from the midwest and

north central states on their way to New Orleans and the Gulf Coast areas of Mississippi, Alabama and Florida for vacations. Since the two recreation developments are very near this major north-south highway, some of these motorists might be influenced to stop for a day or so.

There are some effects of the project that are not evaluated in monetary terms. The establishment of trees and the seeding of bare and caving road banks will remove the unsightly views to people who travel these roads. Such views will be replaced with green grass and trees. Green grass and/or trees will cover the bare-gullied hillsides increasing the scenic attraction of the country side. The effect that vector habitat removal will have on the health and well-being of the individual and community was not evaluated in monetary terms.

Other

There will be a number of acres committed to certain uses in the installation of the structural measures. The following table summarizes these acres.

Summary of Committed Lands

Land Committed To	Total Acres	Present Use: Forest Land (Ac)	Present Use: Open Land (Ac)	Future Use: Forest Land (Ac)	Future Use: Open Land (Ac)	Future Use: Water (Ac)	Future Use: Recreation (Ac)
FWRS	4,246	2,936	1,310	1,744	954	1,548	0
Sediment Pool	(1,548)	(1,104)	(444)	(0)	(0)	(1,548)	(0)
Flood Pool	(2,558)	(1,744)	(814)	(1,744)	(814)	(0)	(0)
Dams, Spillways & outlet chan.	(140)	(88)	(52)	(0)	(140)	(0)	(0)
Multiple Purpose No. 1	751	625	126	0	0	275	476
Seminary Rec. Area	67	40	27	0	0	0	67
Collins Airport Levee	24	14	10	0	24	0	0
Channels	583	536	47	378	205 1/	0	0
Totals	5,671	4,151	1,520	2,122	1,908	1,823	543

1/ An estimated 116 acres of this open land is for maintenance roads, farms, etc., and would retain its classification as forest land because of the low intensity of clearing to be done on this area.

The commitment of this land will have certain environmental effects, some of which are 1. wildlife habitat will be lost or reduced on 2,029 acres of forest land and reduced on an additional 2,122 acres, 2. there will be

an overall gain of 388 acres of open land wildlife habitat, 3. there will be a gain of 1,823 acres of fish habitat and waterfowl habitat, 4. there will be a gain of 275 acres of recreation water, 5. there will be a gain of recreation facilities at the Seminary Recreation Area and the Multiple Purpose Structure No. 1 recreation area, 6. there will be a loss or decrease in silviculture production on 4,151 acres of forest land and agricultural production on 1,520 acres of open land, 7. there will be decreased flooding and flood damages in the flood plains of the watershed, and 8. there will be 12.4 miles of perennial streams inundated by the sediment and recreation pools at the floodwater retarding and multiple purpose structures.

The commitment of mineral resources to be used for construction, inundated by reservoirs or otherwise pre-empted by project measures will have only a slight impact for this project. With modern techniques in the exploration and exploitation field (and in particular to off-set drilling), this project will have no impact on access to, exploration for, or extraction of oil and gas resources which may exist in the immediate area.

The recreation pool of Multiple Purpose Structure No. 1 will inundate archeological site 22-Cv-501 and the construction of the dam for Floodwater Retarding Structure No. 19 will most likely eliminate archeological site 22-Si-508. These sites are considered expendable, therefore the impact on the archeological values is not significant.

FAVORABLE ENVIRONMENTAL EFFECTS

A. Reduce volume and stage of flood flows, agricultural damages by 78 percent and nonagricultural damages (73 homes, 21 small businesses, an airport, 5 churches and a school) by 56 percent.

B. Reduce the gross erosion rate by 28 percent, roadside erosion by 68 percent and sediment damages by 56 percent.

C. Increase the lake fishery potential and waterfowl potential by the establishment of 1,548 surface acres of water in the sediment pools, 275 surface acres in the recreation pool and the management of an additional 600 ponds for fish.

D. Forest land wildlife habitat will be increased on 1,325 acres of land to be planted to trees.

E. Change stand composition of 7,600 acres on forest land by stand manipulation and improvement cutting so that the remaining stand will be capable of greater production of litter and humus which will in turn improve hydrologic conditions and wildlife food and cover and result in greater economic returns to the landowners.

F. Wildlife habitat will be enhanced through wildlife food plantings, wildlife habitat development, wildlife habitat preservation and multiple use forest management.

G. The recreational opportunities within the watershed will be greatly increased by the development of basic recreation facilities at two locations.

H. The employment opportunities and the average income for the people of the watershed and surrounding areas will be enhanced.

I. The life of the lakes, ponds and reservoirs will be extended and the waters will be less turbid because of reduced erosion and sediment production.

J. The necessary site preparation and subsequent tree planting on 117 acres of critically eroding area will not only result in returning this area to economic productivity, but also enhance its aesthetic quality and value.

K. The accelerated fire prevention and fire suppression program will reduce the number of fires which occur and the amount of acreage burned each year. This will allow the timber stands to develop a protective layer of litter and humus to improve hydrologic conditions and enhance the wildlife habitat of the area.

ADVERSE ENVIRONMENTAL EFFECTS

A. Stream fishery potential on 9.7 miles of channel work will be reduced to zero for a period of up to one year and 50 percent after a recovery period of up to 10 years.

B. Stream fishery potential on 10.2 miles of channel work will be reduced to about 25 percent of present for a period of up to one year and to 75 percent after a recovery period of up to five years.

C. Stream fishery potential on 31.9 miles of channel work will be reduced to about 60 percent of present for a period of three months to one year and to 80 percent after a recovery period of up to three years.

D. Forest land wildlife habitat will be lost on 1,364 acres of forest land (1,104 acres in the sediment pools, 88 acres in dams and spillways, 14 acres at the Collins Airport, and 158 acres at the channel work) as a result of structural measures.

E. Forest land wildlife habitat (665 acres) and open land wildlife habitat (153 acres) will be altered in the conversion of this land to recreation uses at Multiple Purpose Structure No. 1 and the Seminary Recreation Area.

F. Open land wildlife habitat will be lost on 444 acres of open land that will be in the sediment pools of the floodwater retarding structures.

G. Forest land wildlife habitat will be lost on 2,440 acres of woodland to be cleared for or returned to crops and pasture. (900 acres to be cleared and 1,540 acres to be restored to crops and pastures.)

H. Agricultural production will be lost or decreased on the 5,671 acres of land (4,151 forest land and 1,520 open land) committed to structural measures.

I. There will be temporary degradation of water quality in the stream below construction during the construction period due to increased sedimentation.

J. There will be air and noise pollution during the construction period due to operation of heavy equipment.

K. There will be 12.4 miles of perennial streams inundated by the establishment of the sediment and recreation pools at the floodwater retarding and multiple purpose structures.

L. Public use of the multiple purpose structure and the Seminary Recreation Area will increase soil compaction, storm runoff, increased sheet erosion fire hazard and risk, risk of more stream pollution, and possible destruction of natural waterfalls in stream near Seminary.

M. There will be a loss of expendable archeological values in the inundation of archeological site 22-Cv-501 and the probable elimination of site 22-Si-508.

ALTERNATIVES

A number of alternatives were considered in the project evaluation process. The more reasonable of these alternatives were evaluated to the point of estimating cost and impacts. Among those alternatives considered were (1) establishment of needed land treatment in the watershed at an accelerated rate, (2) accelerated land treatment and floodwater retarding structures with associated multiple use storage, (3) land treatment and channel only with associated channel recreation development, (4) land treatment, flood proofing and converting present agricultural flood plain to uses less susceptible to flood damages, (5) land treatment, flood plain zoning, flood insurance, and converting present agricultural flood plain to uses less susceptible to flood damages, and (6) no project.

The alternative of establishing needed land treatment would involve installation of those measures described previously under the heading of "Planned Project - Land Treatment". This alternative would eliminate those adverse impacts associated with the installation of planned structural measures. Gross erosion and associated sedimentation would be reduced 28 percent. Fish and wildlife habitat in the watershed would be improved through the installation of such measures as ponds, stocking and management of ponds for fish, odd area wildlife plantings, vegetation of eroding acres, wildlife habitat improvement and preservation, and multiple use management of forest. Floodwater damages would be reduced by about three percent initially, but would become progressively less with time as channels continue to deteriorate. The cost of such a program was estimated to be about $3,137,900.

A second alternative considered consists of the accelerated land treatment, fourteen floodwater retarding structures, one multiple purpose structure for flood prevention and recreation with associated recreational facilities, and the streamside recreation development outlined in the (Planned Project) section. This alternative would retain the favorable impacts of the previous alternative, and would further reduce floodwater damages by 53 percent initially for a total of 56 percent. Flood damages would continue to worsen in the future, however, due to the continuing deterioration of the channel with resultant increases in the frequency and intensity of flooding. Some adverse impacts would result from this alternate in the construction areas of the dams, in structure sediment pools and multiple use pools, and in flood pool areas of the structures. Wildlife habitat values and agricultural production would be lost in converting 1,451 acres of forest land and 512 acres of open land in the dam and emergency spillway areas and in sediment and multiple use pool areas of structures to 1,823 acres of water and 140 acres of reformed land. Wildlife habitat values and agricultural production would be reduced on the 1,885 acres of forest land and 878 acres of open land in flood pool areas of the structures. Production value of lands at the lower flood pool elevations near the sediment and multiple use pools would be reduced the most because of frequent flooding. Such values at the higher flood pool elevations near the emergency spillway crest would be reduced only slightly since flooding would be

infrequent. The vegetation in this area would change from less water tolerant to more water tolerant, especially at the lower elevations. The recreation use of the multiple use pool and adjacent recreation development plus the Seminary recreation development would provide recreational opportunities for an estimated 112,000 people annually. Some 223 acres of forest land and 27 acres of open land would have reduced wildlife values because of people, congestion, parking areas, roads and buildings in the recreation development area. There would be 12.4 miles of perennial streams permanently inundated by the structures. The stream fishery resource in these areas would be lost in creating 1,823 acres of lake fishery. The cost of this program was estimated at $7,690,800.

Another alternate considered was accelerated land treatment and channel work with associated channel recreation development. This alternate would retain the favorable impacts as listed for the alternate of establishing needed land treatment, would effect a reduction in floodwater damages within the watershed equivalent to the previous alternate and would eliminate the commitment of 3,336 acres of forest land and 1,390 acres of open land to dams and pools associated with the proposed project. This alternate would require a constructed channel of increasing size as one proceeds downstream resulting in near total destruction of the stream fishery resource and major clearing of hardwood timber along the channel rights-of-way. This alternate would increase the flood stages downstream of the channel construction areas due to the concentration of flood flows. The associated channel recreation development would provide recreational opportunities for an estimated 25,500 people annually. This alternative was estimated to cost about $9,500,000.

An alternative of accelerated land treatment, flood proofing and converting present agricultural flood plain to uses less susceptible to flood damages was considered. This alternate would retain the favorable effects of the land treatment only alternative and would eliminate all of adverse impacts previously described for structural measures. In order to flood proof the existing buildings, roads, railroads, and other property, it would be necessary to raise their useable levels above the elevation of the 100-year frequency storm. About 55 houses, 21 small businesses, 2 churches, an airport, 50 miles of roads, 50 miles of railroad, and a number of utility lines are effected. The conversion of present agricultural flood plain to uses less susceptible to flood damages would require changed land use of about 11,200 acres of land now used for growing crops and improved pastures. This conversion would result in the loss of agricultural income of about $1,300,000 per year. The estimated cost of this program is $9,292,900. Authorities for implementing such a program are currently not available.

An alternative of accelerated land treatment, flood plain zoning, flood insurance and converting present agricultural flood plain to uses less susceptible to flood damages was also considered. This alternate is about the same as the previous alternate except that flood plain zoning and flood insurance would be implemented instead of flood proofing. This would reduce the initial cost but would leave recurring flood damages to present property that would require compensation by insurance. Since most of the insurance payment costs would be borne by the federal government, there would be a shifting of costs from one source to other sources for a portion of the costs. Damages to roads, bridges, and railroads which do not qualify for flood insurance would go uncompensated. The remaining impacts and effects would be as previously described. The cost of this alternate is estimated to be $6,497,900. Physical hardships associated with flooding in urban areas would be unaffected.

The no project alternative would not eliminate or lessen any of the problems that exist in the watershed. Adverse impacts resulting from the planned project would be eliminated however. This alternative would not reverse the trend of more frequent and more intense flooding in the upper two-thirds of the Main Okatoma flood plain and in the tributary flood plains. Project stream channels would continue to fill causing flood damages to escalate to the point where cultivated and pastured areas would be abandoned in favor of more water tolerant plants. This would result in loss of income and would worsen the social problems. If this was the chosen course of action, an estimated net average annual benefit of $376,800 would be foregone.

SHORT-TERM VS. LONG-TERM USE OF RESOURCES

a. The watershed lands are, in the majority, now being used for agricultural production. This agricultural production is in the form of wood products, pastures, and crops. A very small percent of the land is in the towns and villages of the watershed. In recent years lands used for crops have decreased and lands used for woodland and pastures have increased. This trend has reversed in the very recent past with additional lands being utilized for crops and pastures. The agricultural lands of the watershed are now being utilized well below their potential and capability. This project will allow for better utilization of lands within their capability as desired by the farm operators and as needed by the nation.

b. This project will help to solve a portion of the immediate or short term problems and will serve as a base for satisfying the foreseeable long-term needs. The only options for long-term uses of land that will be reduced is for the 1,823 acres of land that will be under water upstream of the retarding and multiple purpose structures and to a lesser extent the 2,558 acres of land in the temporary retarding pools, recreation areas, and dam and levee uses. There will be disturbance of some soils and vegetation during the construction of the dams, spillways, levees and channel work. Stabilization will occur within the first growing season following construction.

c. The project is compatible with the projected long-term uses of land, water and other natural resources. The project gives sufficient flood protection so that some needed land use adjustments can be made, and provides for improvement in the physical, economic, scenic and environmental features of the watershed. The project is planned in such a way that it can serve as a base for planners of the future to build on and serve the overall needs of the watershed and its people.

d. The project through its improvement of the watershed cover conditions, the reduction of erosion and sedimentation, the retention of water in upland areas and the reduction of water on flood plain areas will serve as a good base for conserving water and land resources long after its design life has passed.

e. The PL-566 watershed program in this sub-region has limited potential with only about nine watersheds suitable for development at this time. Four are under construction, four are in various stages of planning and an application for planning assistance is on file for the ninth.

This watershed along with three U.S. Army Corps of Engineers dams will provide flood protection for the City of Hattiesburg, Mississippi, and towns along the lower Leaf River.

f. There will be no large cumulative effects in the Pascagoula River Basin as a result of PL-566 projects. The watershed areas will cover only about 16 percent of the entire basin and the land use changes within each of the watersheds will be relatively minor. Within the watershed areas, cropland is expected to reduce by 16 percent, pastureland increase by 31 percent, forest land decrease by two percent and miscellaneous lands decrease by 10 percent. This will result in a basin wide change of minus three percent in cropland, plus 13 percent in pastureland, less than one percent reduction in forest land and minus two percent in miscellaneous land. This watershed in conjunction with the proposed U.S. Army Corps of Engineers dams on the Upper Leaf River tributaries will have a significant effect on flood reduction and sediment reduction downstream from their outlets.

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

The project will commit 1,363 acres of woodland and 460 acres of open land to water in the sediment and recreation pools above the dams. There will be 2,558 acres of land committed to use as temporary retarding pools and 140 acres committed to dams and spillways. Including the 275 acres in the recreation pool of the multiple purpose structure there will be 818

acres of land committed to recreation. There will be 24 acres of land committed to levees, etc. at the Collins Airport. The channels will require about 583 acres of additional land.

The land that will be covered by water in the sediment and recreation pools will not be available for other uses during the life of the project. The lands within the temporary retarding pool areas will be limited to uses that can withstand flooding at frequent intervals, especially at elevations near the sediment pool level. The lands within the channel right-of-way can be used only to the extent that the channel itself and access for maintenance is not affected. The lands at the Seminary Recreation area and around the recreation pool at the multiple purpose reservoir will be committed to recreation purpose and will not be available for other uses as the primary purpose. Many of these committed lands can be used for other than their primary commitment but these will have to be secondary to the primary purpose.

CONSULTATION AND REVIEW WITH APPROPRIATE AGENCIES AND OTHERS

General

The formulation of this project has been long and drawn out. There were meetings - organizational and informational - held in the watershed prior to November 28, 1966. The November 28, 1966, meeting was attended by 20 people including farmers, businessmen, professional men, radio station manager and SCS people. The Pascagoula River Basin Study and the PL-566 Program were explained. The Pat Harrison Waterway District Program in connection with PL-566 watersheds was explained. A steering committee was selected for the purpose of organizing a district for the purpose of planning and installing a PL-566 project.

An Okatoma Creek Water Management District meeting with 16 people present was held January 30, 1968. The purpose of this meeting was to discuss the planning of this watershed, discuss the objectives of the project as stated in the application and to discuss measures whereby the objectives could be met. Articles regarding this meeting and planning of the watershed appeared in the local newspaper and in the February 5, 1968, issue of the Clarion Ledger, a state-wide newspaper.

A meeting of the Okatoma Water Management District Commissioners and Steering Committee with 12 people present was held on February 13, 1968, to discuss the location of proposed floodwater retarding structures.

On April 26, 1968, the State Conservationist wrote a letter to all concerned state and federal agencies informing them of the planning of Okatoma Creek Watershed as a PL-566 project. Several agencies responded to this letter including the Department of the Interior (Federal Water Pollution Control Administration and National Park Service), Department

of Agriculture (Forest Service) and others. Mr. A. R. Le Feurre, Chief, Planning and Reports, Federal Water Pollution Control Administration gave information on municipal and industrial wastes entering the streams of the watershed at five specific points. This was further discussed with Mr. John Wakefield, Director, Southeast Region, Federal Water Pollution Control Administration, who stated that they found no need for flow augmentation in the streams involved because the existing low flow was sufficient.

Several working meetings were attended by biologists from the Soil Conservation Service, U. S. Fish and Wildlife Service and Mississippi State Game and Fish Commission. Studies made by the Mississippi State Game and Fish Commission, U. S. Fish and Wildlife Service and Soil Conservation Service indicated that there was high value fish and wildlife resources in the watershed or in certain portions of the watershed. These studies also indicated swimming, camping and some picnicking in the lower reaches of Okatoma Creek.

A meeting was held on November 12, 1968, with the Okatoma Creek Water Management District to give them the results of these studies, to get their consideration of these high value resources, and to explain that Service policy required the consideration of all resources in the area. All present at the meeting were in agreement that full consideration would be given all resources in developing this project and that the final plan would be compatible to all interests insofar as possible.

The next meeting was held on April 22, 1969, with 14 people present. The fish and wildlife resources of the watershed were discussed by the SCS Biologist with the watershed commissioners and other people present. It was pointed out to the commissioners that some of the objectives as listed in the application could not be achieved and give full consideration to the fish and wildlife resources, and that a firm decision on course of action would be needed in the future. The chairman of the watershed commissioners appointed a special committee to assist them in arriving at proper decisions.

During the month of August, 1970, a taped TV Program describing the cooperative efforts of the Soil Conservation Service and the Mississippi State Game and Fish Commission in working with the sponsors of the Okatoma Creek Watershed project was shown over thirteen television stations in Mississippi, Alabama and Louisiana. This story required two 15-minute programs for presentation.

The next formal meeting was held by the Okatoma Creek Watershed Commissioners on November 10, 1970. This was a meeting to review the watershed work plan that was in the preliminary draft stage. Members of the watershed commissioners, members of the steering committees, the Soil Conservation District's Chairmen, members of the Pat Harrison Waterway

District, the lawyer for the water management district and appropriate SCS people attended. The watershed work plan, as presented, was adopted. A further order of business was to make plans for a public hearing at which the watershed work plan would be presented to the general public.

The public hearing on the Okatoma Creek Watershed project was held in the Covington County Court House at Collins, Mississippi, on December 15, 1970. This hearing consisted of presentation of the work plan, public response in favor of the project, public response against the project and a lengthy question and answer period. This hearing was well publicized in advance and well attended by all interested. Information provided by Dr. Charles Brent at the hearing and in later information was given full consideration in later revisions of the Work Plan and Environmental Statement.

As this watershed began the review process it was found that changing criteria for watershed planning required that certain features and evaluations were necessary to answer all of the questions that arise as to whether or not this was the best plan possible for this watershed. The re-evaluations indicated that specific floodwater retarding structures and certain reaches of channel work initially considered could be eliminated, especially if the remaining floodwater retarding structure release rates were modified.

A meeting of the Okatoma Water Management District Commissioners, representatives of the Pat Harrison Waterway District, SCD Commissioners and appropriate SCS personnel was held on June 1, 1972, to present the revised watershed work plan. This plan was officially adopted and the Watershed Planning Staff was directed to proceed with the processing of the plan.

Further review and comment was forthcoming. At a meeting of the same people listed in the preceding paragraph, held on August 20, 1973, the action taken on June 1, 1972, was reaffirmed. The Planning Staff was again asked to proceed with the plan as adopted on June 1, 1972.

The State Liaison Officer, Mississippi Park System, was consulted on the compatibility of recreational measures included in this plan and the Statewide Comprehensive Outdoor Recreation Plan. He stated that they were in accordance with the statewide plan.

In September 1972, a meeting between SCS personnel and Mississippi Department of Archives and History personnel was held to discuss the project measures included in this project relative to possible archeological and historical values and registered values. There were no registered values in the watershed at that time.

In July of 1975 the Mississippi Department of Archives and History completed a study of the archeological resources within the vicinity of the structural measures to be included in the watershed. A report of this study was furnished to the Soil Conservation Service for their use.

Discussions and Disposition of Each Comment on Draft Statement

Comments were requested from the following agencies:

U. S. Department of the Army
U. S. Department of Commerce
U. S. Department of Health, Education, and Welfare
U. S. Department of the Interior
U. S. Department of Transportation
Environmental Protection Agency
Federal Power Commission
U. S. Water Resources Council
Advisory Council on Historic Preservation
Office of Equal Opportunity, USDA
Governor, State of Mississippi
Federal State Programs, Office of the Governor (Official spokesman for the Governor)
Southern Mississippi Planning and Development District
Dr. Charles Brent

Each of the above agencies and individuals with the exception of the following have responded: U. S. Department of Commerce; U. S. Water Resources Council; Office of Equal Opportunity, USDA; Governor, State of Mississippi; Southern Mississippi Planning and Development District; and Dr. Charles Brent.

Each issue, problem, or objection is summarized and a response given on the following pages. Comments are serially numbered where agencies have supplied multiple comments. The original letters of comment appear in Appendix B.

U. S. Department of the Army

Comment: No conflict is foreseen between the work plan and any projects or current proposals of this Department. The draft of the environmental impact statement satisfies the requirements of Public Law 91-190, 91st Congress, insofar as this Department is concerned.

Response: None

U. S. Department of Health, Education, and Welfare

Comment: Based upon the data contained in the draft environmental impact statement, it is our opinion that this proposed action will have only a minor impact upon the human environment with respect to the concerns of this Department.

Response: None

U. S. Department of the Interior

(1) Comment: Reference is made to the nature and general appearance of Okatoma Creek and its tributaries.

Response: None

(2) Comment: Reference is made to "The Proposed Mississippi Wild and Scenic River Act" and the tentative designation of a portion of Okatoma Creek as one of the waterways to be preserved under this act.

Response: This was given due consideration in the planning of this project. For example channel work was eliminated from consideration in this reach of the stream because of its unique values and other reasons. Measures were included in the reservoirs and channel work upstream that would minimize any downstream adverse effect such as reduced design velocities, temporary vegetation during construction, selection of channel construction methods that will effect the minimum disturbance of channel bottoms, banks and overbank areas and by reduction in intensity of channel work.

(3) Comment: Although no channel work will be done in that portion of the creek designated for preservation under impending legislation, the project will have indirect adverse effects on this area. Project construction, periodic channel maintenance, and more expansive and more intensive agricultural activities will result in increased water turbidity, sedimentation, and pesticides contamination in lower reaches of the stream.

Response: Adverse effects related to sedimentation and stream turbidity resulting from project construction and channel maintenance activities are discussed in the work plan and indicated in the environmental impact statement. Such effects will be minimized during construction and maintenance activities and will be temporary in nature. Although the project is expected to result in an increase of cropland in the flood plains directly effected by structural measures of about five percent, there will be an overall reduction in water turbidity and sedimentation in the lower reaches of the stream after the channel work is completed. Since there will be a decrease in sediment which is the major transporter of pesticides, there should be no expected increase in pesticide contamination.

(4) Comment: The lower 10 to 12 miles of Okatoma Creek is an area of unique scenic and biological value in an area with a critically short supply of natural flood plain areas.

Response: This was given due consideration in the planning of this project. For example channel work was eliminated from consideration in this reach of the stream because of its unique values and other reasons. Measures were included in the reservoirs and channel work upstream that would minimize any downstream adverse effect such as reduced design velocities, temporary vegetation during construction, selection of channel construction methods that will effect the minimum disturbance of channel bottoms, banks and overbank areas and by reduction in intensity of channel work.

(5) Comment: With the exception of oil and gas, mineral resources are not discussed.

Response: The discussion of mineral resources has been expanded in the Watershed Work Plan and Environmental Impact Statement to more adequately describe the resources within the watershed. (Work Plan - p. 6, Environmental Impact Statement - p. 22).

(6) Comment: We feel that the table on page 16 which lists fish species as Misc. Minnows, Misc. Darters, and Misc. Madtoms, does not adequately describe the fishery in Okatoma Creek. Additional data pertaining to standing crop, species composition, species dominance, and age class distribution should be included in the work plan. For example, fish sampling indicates that the standing crop of fish in Okatoma Creek is as high as 314.8 pounds per acre with approximately 55 percent of this weight being game species.

Response: Additional fish collecting has been done in the Okatoma Creek Watershed to obtain further information about species diversity. Seining at eight locations, on the Okatoma main stem and major tributaries revealed new species not encountered or identified from the two 1968 fish population samples on the Okatoma main stem. A composite list of the species collected in 1968 and 1975 which has been incorporated into the watershed work plan and the environmental impact statement, includes no endangered and threatened species according to the U. S. list of Endangered Fauna or Mississippi's preliminary list of Endangered and Threatened Vertebrates.

(7) Comment: Current flood frequency estimates are higher than those shown in the work plan and in the draft statement.

Response: This has been checked with the local U. S. Geological Survey and we find that the source of data used was in error. Corrections have been made in both the watershed work plan and in the environmental impact statement. (WP - p. 24, EIS - p. 41.)

(8) Comment: The February 1961 flood is discussed, but a larger flood which occurred in April 1974 might be considered.

Response: A discussion of the April 1974 flood has been included in the watershed work plan and environmental impact statement. (WP - p. 25, EIS - p. 42.)

(9) Comment: Of the 14 proposed floodwater retarding structures mentioned on page 42, it is noted that only eight of these provide for low flow augmentation. In order to insure flows for at least minimum downstream aquatic productivity, it appears that all structures should be designed for a minimal instantaneous low flow release of 0.2 cfs.

Response: The above comment has been concurred with. All of the structures will contain the low flow augmentation devices. (WP - p. 43, EIS - p. 7)

(10) Comment: The work plan should analyze existing flow data for Okatoma Creek and tributaries with a view to determining the releases from the fourteen structures necessary to maintain existing flow regimes, not just low flows downstream.

Response: See response to EPA's comment No. 3 for discussion of low flows in the Okatoma Creek Watershed.

(11) Comment: The vegetative measures that are planned for maintenance roads, disposal areas, earthen embankments, emergency spillways, and spoil banks should be discussed in detail.

Response: The above comment has been concurred with in the appropriate sections of the work plan and environmental impact statement. (WP - p. 44, EIS - p. 8)

(12) Comment: The mitigation features discussed in paragraph 3, page 49, are not adequate to compensate for fish and wildlife habitat losses anticipated as a result of the project. To compensate for the 2,959 acres of forest land that your agency anticipates to be cleared as a result of the project, we recommend that an equal number of acres of flood plain hardwoods be acquired by comprehensive easements or fee title, and managed throughout the project life for wildlife.

Response: Areas to be cleared resulting from project actions amount to less than three percent of the forested land in the watershed. Displaced wildlife will be assimilated into the large forested areas that exist within the watershed and the surrounding four county area. Present watershed wildlife habitat will be improved by the creation of small openings in stands and favoring more desirable species of trees and shrubs to provide food and cover for existing wildlife. The local sponsors do not feel that the loss of forested areas warrants mitigation in view of the improvements for wildlife habitat that will be realized in the surrounding areas.

(13) Comment: The projected recovery rates for fishery habitat page 62, paragraphs 2, 3, and 4, after channelization of Okatoma Creek are incorrect.

Response: We do not have positive data to show that the estimated recovery rates are completely accurate. The types, methods, intensity and intentions of work to be accomplished in Channel Work Types 1/ II, III, and IV were discussed with experienced biologists, engineers, soil conservationists, and others.

1/ Types of Channel Work are: I - Establishment of new channel including necessary stabilization measures, II - Enlargement or realignment of existing channel or stream, III - Cleaning out natural or manmade channel (includes bar removal and major clearing and snagging operation), IV - Clearing and removal of loose debris within channel section, and V - Stabilization as primary purpose.

The estimates used in this plan are the results of these discussions. We believe they are reasonable estimates and that the correctness or incorrectness can be determined only after some channel work has been accomplished as outlined by this plan and the results measured. Also we feel that maintenance of the channel as outlined in the plan and carried out on a continued basis will not be overly restrictive to the re-establishment of a fishery resource. You will note that there is no channel work planned in the vicinity of the stream where 374.8 pounds of fish per acre were found and channel Work Type IV where the 105.2 pounds per acre were found. It is anticipated that as the upstream areas of the stream, where the more intense channel Work Type II and III is planned, that the fish pounds per acre would continue to decrease.

14) Comment: On page 75 it states, "The maintenance of the flood prevention channels will be accomplished by the use of sprays and/or labor and equipment to control obnoxious vegetative growth. This maintenance will assist in the promotion and growth of desirable wildlife habitat. Where sprays are used for maintenance, their use will conform to all applicable laws and/or rules and regulations. Additional maintenance will include the removal of drifts, debris, and/or silt bars as necessary." These practices are not conducive to re-establishing habitat on a significant quality stream, parts of which have been found to support 105.2 to 314.8 pounds of fish per acre. In view of the potential gross habitat destruction associated with stream channelization, the proposed alteration of flow regimes, and the expected increase in agricultural runoff, it is doubtful that the affected stream will show any measurable recovery if maintenance is performed as stated.

Response: See response to prior comment No. 13 of the U. S. Department of the Interior.

15) Comment: The statement that, "There are no wetlands as classified by Circular 39, Wetlands of the United States, Department of the Interior, Fish and Wildlife Service, in this watershed," page 62, paragraph 6, is also incorrect.

Response: There are a number of areas where it is difficult to classify conditions as exist in the watershed into wetland types as described in Circular 39. We are not sure, because of frequency and duration of flooding, that there are wetlands in Okatoma Creek Watershed that fall within Circular 39 descriptions, however, we have classified the estimated 3,280 acres of swamped lands into Type 3, 4, or 7 wetlands and about 7,700 acres of Capability Unit IVw, flood plain land as Type 1 wetland and have included these in the Watershed Work Plan and Environmental Impact Statement.

(16) Comment: The 14 reservoirs range in size from 26 to 300 surface acres and could provide increased recreational use for the entire watershed. In keeping with the recommendations of the Committee on Government Operations contained in the October 21, 1971, House Report, No. 92-586, entitled "Public Access to Reservoirs to Meet Growing Recreation Demands", adequate provisions for public access to all floodwater retarding structures should be considered.

Response: Provision for public access to the floodwater retarding structures or to some of the structures were discussed by the local sponsors. They decided that the extra cost, responsibility, and maintenance would not be offset by any good that could be achieved. The local sponsors have the responsibility for securing all necessary land rights. Public Law 566 nor the Department's rules and regulations require that public access be made available. Therefore, the matter of public access is within the discretion of the local sponsors.

(17) Comment: A review of the abbreviated environmental quality plan does not indicate what input, if any, came from local, State, Federal, and other concerned groups not directly associated with the Soil Conservation Service or local project sponsors.

Response: Input from Local, State and Federal and other concerned groups was provided throughout the planning process. These data were used together with other data gathered during the planning process by an interdisciplinary team of SCS technicians to assist the sponsors in preparing the Environmental Quality Plan. This plan was prepared to be consistent with the requirements of the Water Resource Council's Procedure Number 1 for the phase in of Principles and Standards.

(18) Comment: In the discussion of the environmental quality problems it is stated, "The overflow onto bottom lands has resulted in sediment deposition and land degradation in the bottom land areas." The problems associated with sediment deposition and land degradation could be more objectively evaluated if existing land use in the affected areas was identified rather than the broad classification of "bottom lands."

Response: Classification of "bottom lands" or flood plain areas into land uses has been made in the Abbreviated Environmental Quality Plan as suggested. Such classifications had previously been made in the work plan and environmental impact statement.

(19) Comment: The abbreviated plan should recognize overbank flooding as a natural phenomena which enhances the productivity of timber, fish, and wildlife resources.

Response: This natural phenomena has been recognized in the abbreviated plan as suggested in the above comment.

(20) Comment: Component need No. 4 states in part that, "Wildlife habitat and the stream fishery of Okatoma Creek should be maintained and enhanced in the watershed through the use of good management practices." This is only a statement of the component needs and does not include a discussion of the methods to be used in accommodating these needs. Good management practices should be discussed in detail.

Response: The maintenance and enhancement of the Okatoma Creek Watershed wildlife habitat and the Okatoma Creek fishery resource through good management practices was listed as one of the elements that would help to achieve the component need No. 4 which is Preserve and/or Enhance the Natural Setting of Selected Portions of the Watershed. Some of the good management practices that could be used to help achieve the wildlife habitat and the Okatoma Creek fishery resource portion of the total component need has been included in the abbreviated environmental quality plan portion of the work plan addendum.

(21) Comment: Okatoma Creek and many of its tributaries are perennial streams, having fairly high base flow of good quality. This project may greatly reduce the value of surface water supplies in Okatoma Creek basin by impairing the quantity and quality of discharges.

Response: Low flow augmentation devices will be installed in all floodwater retarding structures and in the multiple purpose structure. They will be designed to release 0.2 csm from their respective drainage areas. This release water will come from about mid-depths of the sediment pools due to temperature and BOD considerations. Their functioning will minimize the effect of the structures on the low flow characteristics of the stream and on water quality. Additional information regarding this subject may be found in the response to EPA comments Nos. 3 and 4.

(22) Comment: The statement does not describe the impact of the project on access to, exploration for, or extraction of oil and gas resources which may exist in the immediate area. Neither does it deal with the commitment of mineral resources to be used for construction, inundated by reservoirs or otherwise pre-empted by project facilities. We believe the impacts on minerals will be slight for this project; however, even a small impact should be noted rather than leaving the matter in doubt. If a mineral resource appraisal was not made, this should be stated.

Response: A resource appraisal, as such, was not made. However, the commitment of mineral resources to be used for construction, inundated by reservoirs or otherwise pre-empted by project measures will have only a slight impact for this project. With modern techniques in the exploration and exploitation field (and in particular to off-set drilling), this project will have no impact on access to, exploration for, or extraction of oil and gas resources which may exist in the immediate area.

(23) Comment: Page 37, second paragraph, next to last sentence, "February 21 storm" is incorrect; it should be February 17 storm.

Response: Corrections have been made as indicated in the above comment. (WP - p. 24, EIS - p. 41)

(24) Comment: The use of recreation data from Appendix H of the Pascagoula River Comprehensive Basin Study, dated December 1966, can be misleading when applied to the Okatoma Creek Watershed. The information should be disaggregated in terms of the market area to be served by the project, updated, and correlated with the 1973 Mississippi Comprehensive Outdoor Recreation Plan as it applies to planning districts 7, 8, and 10.

Response: The recreation data included in the recreation portion of the Water and Related Land Resource Problems section of the work plan and the environmental impact statement has been updated to reflect data obtained from the Mississippi Comprehensive Outdoor Recreation Plan dated 1973. (WP - p. 27, EIS - p. 44)

(25) Comment: Based upon the results of several studies of the effects of stream channelization on fishery resources, it is estimated that the stream segments to be channelized will suffer an 80-90 percent reduction in standing crop of fish. This section should indicate that the planned channel maintenance will extend this loss to a highly productive fishery throughout the project life. The impact of channelization, reservoir construction, and the accompanying destruction of stream bank power and reduced overbank flooding on aquatic fur animals and other wetland wildlife species should be thoroughly explored.

Response: The reference to the effect of stream channelization on Okatoma's fishery resource is probably directed to Types 1/ I and II channel work, of which there are only 11.6 miles (1.9 miles of type I and 9.7 miles of type II) proposed to be installed in this project. Where type I channel work occurs in this project, the existing channel will carry all of the low flows and part of the high flows, therefore the fishery resource should not be affected. Where type II channel work occurs, we have estimated that a high percentage reduction in the stream fishery will result, and it is likely that reduced yields will result in these channel sections for a long period of years. However, gradual recovery should begin after about one year and continue until almost full recovery is achieved. The majority of the channel work proposed, the remaining 42.1 miles of the total 53.7 miles of channel work to be installed, is of the types III and IV. Although types III and IV work will damage fishery habitat, the degree of detriment will not approach the 80-90 percent reduction as suggested. It should also be noted that a greater recovery of the fishery resource will occur and that recovery will take place at a greater rate in subsequent types III and IV channel work. In the same token, types III and IV channel work will have little effect on furbearers and other wildlife.

The project as a whole will reduce overbank flooding. This will in turn have a detrimental effect on wetland species of wildlife. Presently waterfowl utilize the flooded woodlands adjacent to Okatoma Creek during periods of occasional inundation. The mast produced from these forested areas becomes covered with from six inches to a foot of water and provides potential food sources for wintering waterfowl. The loss of streambank cover on the 9.7 miles of type II channel will reduce fur bearer habitat. The increased channel capacity in these sections will increase the possibility of drainage in adjacent areas. The effect on fur bearers in these sections will be detrimental because of the reduction of cover and water in the stream and immediate overbank areas which are essential in their habitat requirements.

1/ Types of Channel Work are: I - Establishment of new channel including necessary stabilization measures, II - Enlargement or realignment of existing channel or stream, III - Cleaning out natural or manmade channel (includes bar removal and major clearing and snagging operation), IV - Clearing and removal of loose debris within channel section, and V - Stabilization as primary purpose.

(26) Comment: We note that channelization and reservoir construction are planned in the Magee area. Therefore, the possible effects of this work (i.e., altered surface water regimes and possible alterations of ground water supplies) on the 455-gallon-per-minute flow from McNair Spring should be discussed. Since McNair Spring is in a scenic setting of tall virgin pines, careful consideration should be given to preserve this unique area.

Response: No proposed channels or reservoirs are located within the immediate vicinity of McNair Springs nor are any large reservoirs located in the drainage area above the springs. It is considered that there will be no effect on the Springs as a result of project action.

Consideration has been given to the preservation of the Spring area under the authority of PL-566. This, however, is not permissable under present rules and regulations. The abbreviated environmental quality plan lists the preservation of McNair Springs as a Component Need and Planned Element.

(27) Comment: There are 23 miles of main Okatoma Creek that will be below the channel work. This reach of the stream will receive turbid water and increased sediment loads at least temporarily following construction. To adequately assess the adverse impact on fish and aquatic life due to an increase in turbidity and sedimentation, the increase in sediment concentration should be expressed in mg/l and percent increase above existing levels. In addition, data should be included relative to the potential for long-term erosion and sedimentation. This data should include information relative to water velocities, stream gradients, and suspended sediment and bed transport in quantitative terms and contrasted to compare pre-project and post-project conditions.

Response: Installation of land treatment measures and construction of floodwater retarding structures prior to channel improvement will reduce the sediment yield from the watershed from a present average annual rate of approximately 1,075 mg/l to an average annual rate of approximately 470 mg/l. The turbid water and increased sediment during construction of the channels will be for a short period of time and will be only slightly higher than 470 mg/l, which is less than present conditions. Data relative to long term erosion and sedimentation is shown in the Effects section of the work plan and the Impacts section of the environmental impact statement.

(28) Comment: Additional information is needed on page 47, paragraph 2, concerning the 1,325 acres to be planted in trees. The location of the plantings, species, site preparation methods, and specific forestry management practices need to be identified before impacts can be evaluated.

Response: The 1,325 acres of tree planting will be scattered throughout the upland area of the watershed. About 117 acres is critical area planting and will be planted with loblolly pines. Site preparation will consist of brush dams as necessary and the establishment of love grass or other drought resistant grasses to hold soils in place until the seedlings are established. The areas will be fertilized, fenced, and protected from fire. The remaining acres are openland plantings and will be planted to loblolly pine. About 260 acres of the openland plantings where there is high grazing risk damage will be fenced. These plantings will be protected from fire to reduce fire damage and so that normal plant succession from openland to forest can take place. It is anticipated that other species such as blackberry vines, green briars, elm, hickory, sweet gum, red oak, and other native species will be present in the resultant stand.

(29) Comment: An additional alternative could be developed incorporating land treatment, zoning and insurance, and acquisition of all or portions of the flood plain for recreation, fish and wildlife as provided for under Public Law 92-251. This alternative could be an expansion of the alternative listed on the bottom of page 53 ending with the statement that, "Authorities for implementing such a program are currently not available."

Response: An alternative similar to the one advocated in the above comment is included in the manuscripts of both the Work Plan (page 37) and the Environmental Impact Statement (page 61).

(30) Comment: We note that the Mississippi Park Commission's Bureau of Outdoor Recreation apparently has not been consulted with in assessing the environmental impact of the project.

Response: The Mississippi Park Commission had been contacted through requests that they review different drafts of the work plan and environmental impact statement. However, a direct contact with the Mississippi Park Commission's Bureau of Outdoor Recreation had not been made. This has now been done. The State Liaison Officer, Mississippi Park Commission, has been contacted and consulted with on the compatibility of the recreation developments proposed for this project with the Statewide Comprehensive Outdoor Recreation Plan.

Department of Transportation

Comment: We have no comment to offer nor do we have any objection to this project.

Response: None

U. S. Environmental Protection Agency

Note: Prior to inclusion of these comments and responses in the final watershed work plan and environmental impact statement we asked EPA to review our responses before they were included in the final documents. The following is a quote from EPA's letter stating their views on our responses. "We have reviewed the Preliminary Final Impact Statement for Okatoma Creek Watershed in Mississippi and find excellent response to our comments on the Draft Environmental Impact Statement. The information provided and the coordination of efforts with the Mississippi Air and Water Pollution Control Commission, demonstrated in the response, greatly facilitate our review."

(1) Comment: There should be a discussion of the several municipal and several industrial waste discharges to Okatoma Creek as identified in the Pascagoula River Basin Water Quality Management Plan.

Response: Data obtained from the Pascagoula River Basin Water Quality Management Plan and updated data obtained from the Mississippi Air and Water Pollution Control Commission were inserted in the environmental setting section of both the environmental impact statement and the watershed work plan.

(2) Comment: We recommend coordination with the Mississippi Air and Water Pollution Control Commission or the Pat Harrison Waterway District, by use of the math model, to determine what effects the channel alterations will have on the assimilative capacity of the stream.

Response: We have followed this recommendation and coordinated with the Mississippi Air and Water Pollution Control Commission where we furnished the hydraulic data for low flow conditions at specific locations for existing and with project conditions. They inserted this data into the math model. The actual coordination procedure was inserted in the hydrology portion of Investigations and Analysis section of the watershed work plan. The results of the analysis obtained through use of the math model were inserted into the Impact section of the environmental impact statement and Effects of Works of Improvement section of the watershed work plan.

(3) Comment: The low flow augmentation releases should not be construed as a benefit in the benefit-cost ratio. Assurance should be given that releases will be maintained to provide 7-day, 10-year flows with no violation of water quality standards.

Response: For assurance that the project will not affect the 7-day, 10-year low flow with no violations of water quality standards, low flow augmentation devices will be installed in each of the 14 floodwater retarding structures and the multiple purpose structure. These structures have an average drainage area of about 6.56 square miles and have low flow release rates averaging about 1.31 cubic feet per second (cfs) from low flow augmentation devices designed to release 0.2 cubic feet per second per square mile (csm). The 0.2 csm design rate for the drainage area size range of the retarding structures is sufficient to maintain their contribution to the downstream 7-day, 10-year low flow because Okatoma Creek is a gaining stream (a stream that increases drainage area equivalent low flow as the drainage area increases). Low flow measurements, at Collins where the drainage area is 167 square miles, show a 7-day, 10-year low flow of 0.26 csm (43 cfs) and Sanford where the drainage area is 240 square miles with a 7-day, 10-year low flow of 0.30 csm (73 cfs). Should it appear in the years ahead after the project is constructed that the 7-day, 10-year low flow has been reduced, the low flow augmentation rates can be increased. Low flow augmentation is not included in the analysis for a benefit-cost ratio.

(4) Comment: We note that brush control by open burning is mentioned. We suggest that an estimate of annual acreage to be cleared is needed in order to assess its effect on air quality. We must also point out that brush control could indicate the use of chemicals. Such chemicals and their use should receive EPA approval.

Response: Approximately 7,430 acres of brush control will be accomplished by the individual landowners over the eight-year project installation period. The average annual acreage of brush control will be about 925 acres. Brush control is the killing, suppressing or managing brush on all areas except cropland and woodland (forest). The past trends indicate that most of the brush control will be accomplished by mechanical means such as clipping, bush hogging, and pushing up with heavy equipment. For other means of brush control, such as chemical or controlled burning, the local landowners will be informed of and requested to comply with applicable state and federal regulations. The landowners will be informed of and requested to purchase only those chemicals that have EPA approval stamped on the container

and apply as the container's directions prescribe. For open controlled burning, the landowners will be requested to follow Mississippi's Air Quality Guidelines which have been forwarded to all SCS county offices.

Federal Power Commission

Comment: A review of the watershed plan indicates that it should have no significant effect on any hydroelectric project licensed by the Federal Power Commission. During construction, any electrical transmission lines or natural gas pipelines should be protected and the proper authorities should be notified.

Response: The Service contracting procedures includes provisions for the protection of electrical power transmission lines, natural gas lines and other utilities during the construction process.

Advisory Council on Historic Preservation

(1) Comment: Please furnish additional data indicating compliance with Section 106 of the National Historic Preservation Act of 1966 (16 U. S. C. 470 (f). The Council notes that you have consulted the National Register of Historic Places for 1973, but we must have evidence that the most recent listing of the National Register has been consulted (see Federal Register, February 4, 1975, and monthly supplements each first Tuesday thereafter) and that either of the following conditions is satisfied:

1. If no National Register property is affected by the project, a section detailing this determination must appear in the environmental statement.

2. If a National Register property is affected by the project, the environmental statement must contain an account of steps taken in compliance with Section 106 and a comprehensive discussion of the contemplated effects on the National Register property.

Response: The most recent listing of the National Register (February 4, 1975, and April 1, 1975) has been consulted along with monthly supplements and no National Register property is affected by the project. In addition we are on the mailing list to receive listings of all properties that are approved by the Mississippi Historic Preservation Professional Review Board for nomination to the National Register of Historic Places. A check of these listings back to November 1972 does

not indicate that any properties within the watershed area has been nominated. Also, the archeological report (June 1975) prepared by the Mississippi Department of Archives and History states that there are no properties within the watershed area that are included in the National Register and that there are no National Register applications contemplated in Simpson, Covington, or Smith Counties.

) Comment: Please furnish additional data indicating: Compliance with Executive Order 11593 of May 13, 1971.

1. In the case of lands not under the control or jurisdiction of the Federal Government, a statement should be made as to whether or not the proposed undertaking will contribute to the preservation and enhancement of non-federally owned districts, sites, buildings, structures, and objects of historical, archeological, architectural, or cultural significance. The results of the archeological survey should be included in the final statement. The Council would refer the Soil Conservation Service to Section 800.4(a) of the Council's Procedures for the Protection of Historic and Cultural Properties (36CFR Part 800) and note that the salvage or excavation of archeological properties may constitute an adverse effect upon a site. This would be particularly serious if an archeological site were determined eligible for listing in the National Register.

Response: The proposed undertaking will contribute to the preservation and enhancement of non-federally owned districts, sites, buildings, structures, and objects of historical, archeological, architectural or cultural significance if such are found to exist within the watershed area.

) Comment: The Advisory Council suggests that the environmental statement contain copies of the correspondence with the State Historic Preservation Officer.

Response: Copies of the correspondence with the State Historic Preservation Officer are not included because they do not provide a good indication of the contacts between the Service and the State Historic Preservation Officer and other personnel of the Mississippi Department of Archives and History. The contacts along with correspondence include telephone calls, meetings, personal contacts, field trips, contract work, personal opinions, etc.

(4) Comment: The Advisory Council has no comment at this time on the watershed work plan.

Response: None

State Clearinghouse for Federal Programs

(1) Comment: The proposed project appears to be consistent with Present State goals and policies.

Response: None

(2) Comment: The Mississippi Board of Water Commissioners' summary of state agency comments and their individual letters of comment are a part of the "Clearinghouse" action.

Response: None

(3) Comment: The requirements of U. S. Office of Management and Budget Circular No. A-95 has been met at the State level.

Response: None

State of Mississippi, Board of Water Commissioners

(1) Comment: No objections were brought out by this State agency review as to the need for the project. However, the State Board of Health has indicated by their response that the SCS has not addressed their earlier comments of July 5, 1974, in regard to this project. Therefore, we recommend that these comments be addressed and considered in any future revision of the above captioned Work Plan and Environmental Impact Statement.

Response: The comments by the State Board of Health of July 5, 1974, had been responded to in later drafts. The State Board of Health representative who made the comments was contacted by telephone and the responses discussed with him. Specific wording desired by the State Board of Health was then discussed and this specific wording is included in the final Work Plan and Environmental Impact Statement. (WP - p. 50, EIS - p. 13)

(2) Comment: Although groundwater obtained from the deeper aquifers in the study area may be of limited value for use as irrigation water because of excessive levels of sodium, there are indications of adequate supplies of acceptable quality groundwater occurring in shallower aquifers.

Response: The above comment has been incorporated into the work plan and environmental impact statement. (WP - p. 6, EIS - p. 22)

(3) Comment: Data from the Executive Summary of the Mississippi Statewide Comprehensive Outdoor Recreation Plan for 1973 reflect a need in the study area for practically all forms of outdoor recreation in the next 15 to 20 years. Incentives could possibly be provided to encourage the use of potential recreational resources stemming from the construction of various flood retarding structures within the Okatoma Creek Watershed.

Response: Please refer to the response to U. S. Department of the Interior No. 16.

(4) Comment: The total beneficial effects under the selected alternative (NED) should be $798,000. Also, under the same account, the net beneficial effects should be $300,000.

Response: The corrected figures have been inserted into the addendum.

Mississippi State Board of Health

(1) Comment: We understand that water contact sports are to be involved with Multiple Purpose Structure No. 1. Before this lake is constructed, we believe that a watershed study should be made to determine if there are any sources of domestic or agricultural pollution in the watershed which might cause the water to be unsatisfactory for contact sports.

Response: The work plan and environmental impact statement reflect the following information with regard to the above comment; Water quality in the recreation lake will be monitored by the sponsors, especially before and during the water contact sport season to assure safe water quality. The drainage area above MPS-1 was studied for significant pollution sources which might cause the water to be unsatisfactory for contact sports with none discovered, however, an additional study will be made prior to construction.

(2) Comment: Plans and specifications for any public water supply facilities should be reviewed and approved by the Mississippi State Board of Health before construction is begun.

Response: The installation of water, sewage, and recreation facilities will be in accordance with the requirements of state and local agencies having specific interests or jurisdiction in the specific construction and includes review and approval by the State Board of Health and the Air and Water Pollution Control Commission as appropriate. (WP - p. 50, EIS - p.13)

(3) Comment: Since septic tanks and underground absorption fields cannot generally serve public recreation areas, plans and specifications for the needed sewerage facilities should be reviewed and approved by the Mississippi Air and Water Pollution Control Commission before construction begins.

Response: See response to comment No. 2 above.

(4) Comment: Plans and specifications for the recreation area facilities should also be reviewed by the Mississippi State Board of Health to determine if they are properly designed for use by the physically handicapped with a minimum of difficulty.

Response: See response to No. 2 above.

(5) Comment: Where water contact sports are planned for a body of water, we believe that the Board of Supervisors in the applicable county or counties should be requested to adopt appropriate subdivision regulations and zoning ordinances to prevent development on privately owned land in the watershed which might cause degradation of the quality of the water.

Response: The local sponsors have discussed this problem and are aware of the potential danger of unrestricted development in the drainage area above the reservoir. They have already begun to work with the proper authorities for proper control.

LIST OF APPENDIXES

Appendix A - Comparison of Benefits and Costs for Structural Measures

Appendix B - Letters of Comment Received on the Draft Environmental Statement

Appendix C - Project Map

APPROVED BY W. L. Heard DATE 9-16-75

W. L. Heard, State Conservationist

Appendix A

COMPARISON OF BENEFITS AND COSTS FOR STRUCTURAL MEASURES

Okatoma Creek Watershed, Mississippi
(Dollars)

Evaluation Unit	AVERAGE ANNUAL BENEFITS 1/								Average Annual Cost 3/	Benefi Cost Ratio
	Damage Reduction	Changed Land Use	More Intensive Use: Agriculture	More Intensive Use: Non agriculture	Planned Recreation	Secondary	Redevelopment	Total		
Floodwater Retarding Structures 14 and 16; Channel work on Haw Branch and Dry Creek	60,800	2,500	4,600	0	0	6,700	6,100	80,700	38,500	2.1:1.
Floodwater Retarding Structures 2, 3, 5, 6, 7, 8, 9, 10, 12, 17, 18, and 19; Multiple Purpose Structure No. 1 with Basic Facilities; Seminary Recreation Area; Channel work on: Okatoma and Mill Creeks and Collins Airport Levee System	391,100	32,900	53,800	8,700	167,400	70,100	70,100	794,100	415,800	1.9:1.
Subtotal	451,900	35,400	58,400	8,700	167,400	76,800	76,200	874,800	454,300	1.9:1.
PROJECT ADMINISTRATION	////	////	////	////	////	////	////	////	43,700	////
GRAND TOTAL	2/451,900	35,400	58,400	8,700	167,400	76,800	76,200	874,800	498,000	1.8:1.

1/ Price base: Current normalized.

2/ In addition, it is estimated that land treatment measures will provide flood damage reduction benefits of $58,300 annually.

3/ Installation costs (1973 price) amortized at 6 7/8% for 100 years.

DEPARTMENT OF THE ARMY
WASHINGTON, D.C. 20310

Honorable Robert W. Long
Assistant Secretary of Agriculture
Washington, D. C. 20250

Dear Mr. Long:

In compliance with the provisions of Section 5 of Public Law 566, 83d Congress, the Administrator of the Soil Conservation Service, by letter of 25 November 1974, requested the views of the Secretary of the Army on the work plan for Okatoma Creek Watershed, Mississippi.

We have reviewed this work plan and foresee no conflict with any projects or current proposals of this Department. The draft of the environmental statement satisfies the requirements of Public Law 91-190, 91st Congress, insofar as this Department is concerned.

Sincerely,

Charles R. Ford

Charles R. Ford
Chief
Office of Civil Functions

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
REGION IV
50 7TH STREET N.E.
ATLANTA, GEORGIA 30323

January 23, 1975

OFFICE OF THE
REGIONAL DIRECTOR

Re: 472-11-74

Mr. W. L. Heard
State Conservationist
Soil Conservation Service
U. S. Department of
Agriculture
Post Office Box 610
Jackson, Mississippi 39205

Dear Mr. Heard:

Subject: Okatoma Creek Watershed
Covington, Forrest, Jones,
Simpson and Smith Counties
Mississippi

We have reviewed the subject draft Environmental Impact Statement. Based upon the data contained in the draft, it is our opinion that this proposed action will have only a minor impact upon the human environment with respect to the concerns of this Department.

Sincerely yours,

Charles M. Dixon

James E. Yarbrough
Regional Environmental Officer

United States Department of the Interior

OFFICE OF THE SECRETARY
WASHINGTON, D.C. 20240

In Reply Refer To
ER-74/1444

MAR 21 1975

Dear Mr. Heard:

Thank you for your letter of November 25, 1974, requesting our views and comments on the draft environmental statement and work plan for the Okatoma Creek Watershed, Covington, Simpson, Jones, Smith and Forrest Counties, Mississippi. Comments on both documents are presented below.

WORK PLAN

General Comments

Okatoma Creek is a free flowing stream having a continuous base flow that is maintained by eighteen major tributaries evenly distributed along its main stem. South of Seminary, Mississippi, the main stem of Okatoma Creek flows through a series of sandstone outcroppings. This gives the creek an Ozark stream appearance, with small falls, deep pools, flat sandstone ledges, and steep banks. These features make this reach of Okatoma Creek an outstanding scenic area.

The proposed Mississippi Wild and Scenic River Act declares it " . . . to be the policy of the State of Mississippi that certain selected rivers of the State which, with their immediate environment, possess outstandingly remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar values shall be preserved in free-flowing and natural condition, and that they and their immediate environments shall be protected for the benefit and enjoyment of present and future generations." A segment of Okatoma Creek extending from a point 1 mile north of Seminary, Mississippi, to its junction with the Bowie River has tentatively been designated as one of the scenic waterways to be preserved under this act.

CONSERVE AMERICA'S ENERGY

Save Energy and You Serve America!

Although no channel work will be done in that portion of the creek designated for preservation under impending legislation, the project will have indirect adverse effects on this area. Project construction, periodic channel maintenance, and more expansive and more intensive agricultural activities will result in increased water turbidity, sedimentation, and pesticide contamination in lower reaches of the stream. This lower 10-12 miles of Okatoma Creek is an area of unique scenic and biological value in an area with a critically short supply of natural flood plain areas.

Specific Comments

Mineral Resources

With the exception of oil and gas, mineral resources are not discussed, page 6. Mineral resources of the five counties include oil, gas, sand and gravel, stone, and clays. In addition, numerous pipelines cross the area carrying petroleum and natural gas to distribution centers and refineries. Within the general project area only sand and gravel production is known; however, as the work plan notes, a good possibility for the discovery of oil and gas exists because of several nearby producing fields.

Fish and Wildlife Resources

We feel that the table on page 16 which lists fish species as Misc. Minnows, Misc. Darters, and Misc. Madtoms, does not adequately describe the fishery in Okatoma Creek. Additional data pertaining to standing crop, species composition, species dominance, and age class distribution should be included in the work plan. For example, fish sampling indicates that the standing crop of fish in Okatoma Creek is as high as 314.8 pounds per acre with approximately 55 percent of this weight being game species.

Floodwater Damages

Current flood frequency estimates are higher than those shown on page 23 of the work plan, and page 37, fourth paragraph of the draft statement. For example, the 50-year peak discharge of Okatoma Creek at State Highway 590 at Seminary is 22,000 cfs (cubic feet per second) based on USGS Water-Supply Paper 1674. WSP 1674 is probably more applicable for Okatoma Creek basin than the report, "Floods in Mississippi, Magnitude and Frequency."

The February 1961 flood is discussed, but a larger flood which occurred in April 1974 might be considered. A brief description of the flood might be as follows: "Record floods occurred in Okatoma Creek basin during April 1974 as a result of as much as 20 inches of rainfall, most of which fell in a 30-hour period on April 12-13. Recorded rainfall totals include 20.76 inches near Sanitorium and 20.36 inches near Magee. Flood discharges at two sites on Okatoma Creek near Magee (drainage area 24 and 38 square miles) were two times the expected 50-year flood. Okatoma Creek at Seminary had a peak discharge of 31,000 cfs which is 1.4 times the 22,000 cfs 50-year flood."

Multiple Purpose Structures

Of the fourteen proposed floodwater retarding structures, mentioned on page 42, it is noted that only eight of these provide for low flow augmentation. In order to insure flows for at least minimum downstream aquatic productivity, it appears that all structures should be designed for a minimal instantaneous low flow release of 0.2 cfs. The work plan should analyze existing flow data for Okatoma Creek and tributaries with a view to determining the releases from the fourteen structures necessary to maintain existing flow regimes, not just low flows downstream.

The vegetative measures that are planned for maintenance roads, disposal areas, earthen embankments, emergency spillways, and spoil banks should be discussed in detail in this section, page 45, paragraph 3.

The mitigation features discussed in paragraph 3, page 49 are not adequate to compensate for fish and wildlife habitat losses anticipated as a result of the project. To compensate for the 2,959 acres of forest land that your agency anticipates to be cleared as a result of the project, we recommend that an equal number of acres of flood plain hardwoods be acquired by comprehensive easements or fee title, and managed throughout the project life for wildlife.

Effects of Works of Improvements

The projected recovery rates for fishery habitat page 62, paragraphs 2, 3, and 4, after channelization of Okatoma Creek are incorrect. On page 75 it states, "The maintenance of the flood prevention channels will be accomplished by the use of sprays and/or labor and equipment to control obnoxious vegetative growth. This maintenance will assist in the promotion and

growth of desirable wildlife habitat. Where sprays are used for maintenance, their use will conform to all applicable laws and/or rules and regulations. Additional maintenance will include the removal of drifts, debris, and/or silt bars as necessary." These practices are not conducive to reestablishing habitat on a significant quality stream, parts of which have been found to support 105.2 to 314.8 pounds of fish per acre. In view of the potential gross habitat destruction associated with stream channelization, the proposed alteration of flow regimes, and the expected increase in agricultural runoff, it is doubtful that the affected stream will show any measurable recovery if maintenance is performed as stated.

The statement that, "There are no wetlands as classified by Circular 39, Wetlands of the United States, Department of Interior, Fish and Wildlife Service, in this watershed," page 62, paragraph 6, is also incorrect. On page 17, paragraph 2, of the work plan it is stated, "In the wooded areas along Okatoma proper and some of its tributaries, beaver ponds provide wood duck habitat and are also fished to some extent." According to Wetlands of the United States, page 40, "Beaver flows oftentimes impound water-deficient wetlands such as meadows (Type 2), shrub swamps (Type 6), and wooded swamps (Type 7) into wetlands with shallow surface water (Types 3 and 4), thus converting them into areas of more value to waterfowl (fig. 12)." We note that under preproject conditions lands directly affected by structural measures are about 72 percent forested, and also that your classification for bottom land soils includes swamp. Based on these statements it seems that some of these overflow lands consisting of bottom land hardwoods would be classified as wetlands Type 1.

It is stated on page 64, paragraph 6 that, "However, since public access will not be provided the Watershed Commissioners will discourage their use for such purpose because of lack of sanitary facilities, possibility of increased maintenance of the flood prevention features and safety considerations." These fourteen reservoirs range in size from 26 to 300 surface acres and could provide increased recreational use for the entire watershed. In keeping with the recommendations of the Committee on Government Operations contained in the October 21, 1971, House Report No. 92-586, entitled "Public Access to Reservoirs to Meet Growing Recreation Demands," adequate provisions for public access to all floodwater-retarding structures should be considered.

Specific Comments on the Addendum to the Work Plan

Introduction

It is stated, "The abbreviated environmental quality plan has been developed by an interdisciplinary team using information and data assembled during investigations and analysis for the watershed work plan." However a review of the abbreviated environmental quality plan does not indicate what input, if any, came from local, State, Federal, and other concerned groups not directly associated with the Soil Conservation Service or local project sponsors.

Environmental Quality Plan

In the discussion of the environmental quality problems it is stated, "The overflow onto bottom lands has resulted in sediment deposition and land degradation in the bottom land areas." The environmental problems associated with sediment deposition and land degradation could be more objectively evaluated if existing land use in the affected areas was identified rather than the broad classification of "bottom lands." Furthermore, the abbreviated plan should recognize overbank flooding as a natural phenomena which enhances the productivity of timber, fish, and wildlife resources.

Component need No. 4 states in part that, "Wildlife habitat and the stream fishery of Okatoma Creek should be maintained and enhanced in the watershed through the use of good management practices." This is only a statement of the component needs and does not include a discussion of the methods to be used in accommodating these needs. "Good management practices" should be discussed in detail.

Draft Environmental Impact Statement

Surface Water Resources

Okatoma Creek and many of its tributaries are perennial streams, having fairly high base flow of good quality. This project may greatly reduce the value of surface-water supplies in Okatoma Creek basin by impairing the quantity and quality of discharges. Unfortunately, there is no discussion of this in the statement, page 23.

Water and Related Land Resource Problems

The statement does not describe the impact of the project on access to, exploration for, or extraction of oil and gas resources which may exist in the immediate area. Neither does it deal with the commitment of mineral resources to be used for construction, inundated by reservoirs or otherwise preempted by project facilities. We believe the impacts on minerals will be slight for this project; however, even a small impact should be noted rather than leaving the matter in doubt. If a mineral resource appraisal was not made, this should be stated.

Page 37, second paragraph, next to last sentence: "February 21 storm" is incorrect; it should be "February 17 storm."

The use of recreation data from Appendix H of the Pascagoula River Comprehensive Basin Study, dated December 1966, can be misleading when applied to the Okatoma Creek Watershed. The information should be disaggregated in terms of the market area to be served by the project, updated, and correlated with the 1973 Mississippi Comprehensive Outdoor Recreation Plan as it applies to planning districts 7, 8, and 10. This would provide the information to evaluate the project's impact in terms of recreational and associated environmental values, page 40.

Environmental Impacts

Based upon the results of several studies of the effects of stream channelization on fishery resources, it is estimated that the stream segments to be channelized will suffer an 80-90 percent reduction in standing crop of fish. This section should indicate that the planned channel maintenance will extend this loss to a highly productive fishery throughout the project life. The impact of channelization, reservoir construction, and the accompanying destruction of streambank power and reduced overbank flooding on aquatic fur animals and other wetland wildlife species should be thoroughly explored in this section.

We note that channelization and reservoir construction are planned in the Magee area. Therefore, the possible effects of this work (i.e., altered surface water regimes and possible alterations of ground water supplies) on the 455-gallon-per-minute flow from McNair Spring should be discussed. Since

McNair Spring is in a scenic setting of tall virgin pines, careful consideration should be given to preserve this unique area.

It is stated on page 45, paragraph 5 that, "There are 23 miles of main Okatoma Creek that will be below the channel work." This reach of the stream will receive turbid water and increased sediment loads at least temporarily following construction. To adequately assess the adverse impacts on fish and aquatic life due to an increase in turbidity and sedimentation, the increase in sediment concentration should be expressed in mg/l and percent increase above existing levels. In addition, data should be included in this section relative to the potential for long-term erosion and sedimentation. This data should include information relative to water velocities, stream gradients, and suspended sediment and bed transport in quantitative terms and contrasted to compare pre-project and post-project conditions.

Additional information is needed on page 47, paragraph 2, concerning the 1,325 acres to be planted in trees. The location of the plantings, species, site preparation methods, and specific forestry management practices need to be identified before impacts can be evaluated.

Alternatives

An additional alternative could be developed incorporating land treatment, zoning and insurance, and acquisition of all or portions of the flood plain for recreation, fish and wildlife as provided for under Public Law 92-251. This alternative could be an expansion of the alternative listed on the bottom of page 53 ending with the statement that "Authorities for implementing such a program are currently not available."

Consultation and Review

We note that the Mississippi Park Commission's Bureau of Outdoor Recreation apparently has not been consulted with in assessing the environmental impact of the project. Accordingly, we suggest the State Liaison Officer, Mr. Rae Sanders, Mississippi Park System, Robert E. Lee Building, Jackson, Mississippi 39201, be contacted.

In summary, Okatoma Creek is a highly productive fluctuating water system, segments of which have unique scenic and biological values. The draft work plan is generally deficient in

its consideration and analyses of the project affects on these resources. In addition, we believe that the environmental statement does not adequately describe project plans, fish and wildlife resources, and environmental impacts of the project. As presently proposed, this project will have severe adverse effects on scenic quality, water quality, the wetland ecosystem, and associated fish and wildlife resources. Consideration should be given to less environmentally damaging alternatives such as flood plain acquisition, selective snagging and clearing, flood plain zoning, sand pumping to deepen constructed areas, and flood plain levee systems. These alternatives could provide the desired flood protection and lessen the detrimental effects on fish and wildlife. Channel excavation would be particularly damaging and should be avoided.

Sincerely yours,

Stanley D. Doremus

Deputy Assistant Secretary of the Interior

Mr. W. L. Heard
State Conservationist
Soil Conservation Service
P.O. Box 610
Jackson, Mississippi 39205

DEPARTMENT OF TRANSPORTATION
UNITED STATES COAST GUARD

MAILING ADDRESS:
U.S. COAST GUARD (G-WS/73)
400 SEVENTH STREET S.W.
WASHINGTON, D.C. 20590
PHONE (202) 426-2262

22 JAN 1975

Mr. W. L. Heard
State Conservationist
Soil Conservation Service
P. O. Box 610
Jackson, Mississippi 39205

Dear Mr. Heard:

This is in response to your letter of 25 November 1974 addressed to Commandant, U. S. Coast Guard concerning a draft environmental statement for the Okatoma Creek Watershed, Jones County, Mississippi.

The Department of Transportation has reviewed the material submitted. We have no comments to offer nor do we have any objection to this project.

The opportunity to review this draft statement is appreciated.

Sincerely,

W. E. Caldwell

W. E. CALDWELL
Captain, U.S. Coast Guard
Deputy Chief, Office of Marine
Environment and Systems
By direction of the Commandant

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION IV

1421 PEACHTREE ST., N. E.
ATLANTA, GEORGIA 30309

February 14, 1975

Mr. W. L. Heard
State Conservationist
U. S. Soil Conservation Service
P. O. Box 610
Jackson, Mississippi 39305

Dear Mr. Heard:

We have reviewed the Draft Environmental Impact Statement for the Okatoma Creek Watershed in Mississippi and find that we have environmental reservations about some aspects of the proposed action. We also find that additional information should be provided. For this reason, we have assigned a rating of ER (environmental reservations) to the project and 2 (insufficient information) to the Impact Statement.

First, the Pascagoula River Basin Water Quality Management Plan identifies several municipal and several industrial waste discharges to Okatoma Creek; however, there is no discussion of these discharges in the Impact Statement. This should be provided.

We also recommend coordination with the Mississippi Air and Water Pollution Control Commission or the Pat Harrison Waterway District, by use of the math model, to determine what effects the channel alterations (flow modifications) will have on the assimilative capacity of the stream.

We note that release from impoundments will be used for low flow augmentation; however, this should <u>not</u> be construed as a benefit in the benefit-cost ratio. Further, assurance should be given that the releases will be maintained to provide 7-day, 10-year flows with no violations of water quality standards.

We further note that brush control by open burning is mentioned. We suggest that an estimate of annual acreage to be cleared in this manner is needed in order to assess its effect on air quality. We must also point out that brush control could indicate the use of chemicals. Such chemicals and their use should receive EPA approval.

We would appreciate receiving five copies of the final environmental impact statement when it is available. If we can be of further assistance in any way, please let us know.

Sincerely,

Jack E. Ravan
Regional Administrator

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION IV

1421 PEACHTREE ST., N. E.
ATLANTA, GEORGIA 30309

April 15, 1975

Mr. W. L. Heard
State Conservationist
U. S. Soil Conservation Service
P. O. Box 610
Jackson, Mississippi 39205

Dear Mr. Heard:

We have reviewed the Preliminary Final Impact Statement for Okatoma Creek Watershed in Mississippi and find excellent response to our comments on the Draft Environmental Impact Statement.

The information provided and the coordination of efforts with the Mississippi Air and Water Pollution Control Commission demonstrated in the response greatly facilitate our review.

If we can be of further assistance in any way, please let us know.

Sincerely,

David R. Hopkins

David R. Hopkins
Chief, EIS Branch

FEDERAL POWER COMMISSION
REGIONAL OFFICE

730 Peachtree Building
Atlanta, Georgia 30308
December 11, 1974

Mr. W. L. Heard
State Conservationist
U. S. Department of Agriculture
Soil Conservation Service
Post Office Box 610
Jackson, Mississippi 39205

Dear Mr. Heard:

We appreciate the opportunity to comment on the proposed Watershed Work Plan for the Okatoma Creek Watershed, Mississippi, which we received with your letter dated November 25, 1974.

Our primary concern with projects or improvements that affect the land and water resources is their possible effect on natural gas pipeline facilities and bulk electric power facilities, including existing and potential hydroelectric developments.

A review of the watershed plan indicates that it should have no significant effect on any hydroelectric project licensed by the Federal Power Commission.

During construction, any electrical transmission lines or natural gas pipelines should be protected and the proper authorities should be notified.

Very truly yours,

C. L. Fishburne

C. L. Fishburne
Regional Engineer

Advisory Council
On Historic Preservation
[illegible]
Washington DC 20005

Mr. W.L. Heard
State Conservationist
U.S. Department of Agriculture
Soil Conservation Service
P.O. Box 610
Jackson, Mississippi 39205

Dear Mr. Heard:

This is in response to your request of November 25, 1974, for comments on the environmental statement for Okatoma Creek Watershed, Mississippi. Pursuant to its responsibilities under Section 102(2)(C) of the National Environmental Policy Act of 1969, the Advisory Council on Historic Preservation has determined that while you have discussed the historical, architectural, and archeological aspects related to the undertaking, the Advisory Council needs additional information to adequately evaluate the effects on these cultural resources. Please furnish additional data indicating:

a. Compliance with Section 106 of the National Historic Preservation Act of 1966 (16 U.S.C. 470(f)). The Council notes that you have consulted the National Register of Historic Places for 1973, but we must have evidence that the most recent listing of the National Register has been consulted (see Federal Register, February 4, 1975 and monthly supplements each first Tuesday thereafter) and that either of the following conditions is satisfied:

   1. If no National Register property is affected by the project, a section detailing this determination must appear in the environmental statement.

   2. If a National Register property is affected by the project, the environmental statement must contain an account of steps taken in compliance with Section 106 and a comprehensive discussion of the contemplated effects on the National Register property.

b. Compliance with Executive Order 11593 of May 13, 1971.

1. In the case of lands not under the control or jurisdiction of the Federal Government, a statement should be made as to whether or not the proposed undertaking will contribute to the preservation and enhancement of non-federally owned districts, sites, buildings, structures, and objects of historical, archeological, architectural, or cultural significance. The results of the archeological survey should be included in the final statement. The Council would refer the Soil Conservation Service to Section 800.4(a) of the Council's "Procedures for the Protection of Historic and Cultural Properties" (36CFR Part 800) and note that the salvage or excavation of archeological properties may constitute an adverse effect upon a site. This would be particularly serious if an archeological site were determined eligible for listing in the National Register.

Finally, the Advisory Council suggests that the environmental statement contain copies of the correspondence with the State Historic Preservation Officer.

The Advisory Council has no comment at this time on the watershed work plan.

Should you have any questions or require any additional assistance, please contact Stephen Cochran (A.C. 202-254-3380) of the Advisory Council staff.

Sincerely yours,

John D. McDermott

John D. McDermott
Director, Office of Review
and Compliance

STATE OF MISSISSIPPI

OFFICE OF THE GOVERNOR

LIAM L. WALLER
GOVERNOR

WM. M. HEADRICK
COORDINATOR OF FEDERAL-STATE PROGRAMS

STATE CLEARINGHOUSE FOR FEDERAL PROGRAMS

Mr. W. L. Heard, State Conservationist
USDA, Soil Conservation Service
Post Office Box 610
Jackson, Mississippi 39205

State Clearinghouse Number
74112601

Date: January 30, 1975

CT DESCRIPTION: Draft Environmental Statement and Watershed Work Plan for Watershed tion, Flood Prevention, Agricultural Water Management and Other Beneficial Purposes, Creek Watershed, Covington, Simpson, Jones, Smith and Forrest Counties, Mississippi.

. The State Clearinghouse has received notification of intent to apply for Federal assistance as described above.

. The State Clearinghouse has reviewed the application(s) for Federal assistance described above.

. After proper notification, no State agency has expressed an interest in conferring with the applicant(s) or commenting on the proposed project.

. The proposed project is: ( ) consistent ( ) inconsistent with an applicable State plan for Mississippi.

. Although there is no applicable State plan for Mississippi, the proposed project appears to be: (x) consistent ( ) inconsistent with present State goals and policies.

NTS: The attached letter with enclosures from the Mississippi Board of Water loners is made a part of this Final Clearinghouse action.

This notice constitutes FINAL STATE CLEARINGHOUSE REVIEW AND COMMENT. The ents of U.S. Office of Management and Budget Circular No. A-95 have been met at e level.

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tral Miss. P & DD
st Central Miss. P & DD

Edward A. May, Jr.
Clearinghouse Director

State of Mississippi

BOARD OF WATER COMMISSIONERS
416 NORTH STATE STREET
JACKSON, MISSISSIPPI 39201
354-7236

January 22, 1975

Mr. W. L. Heard
State Conservationist
U.S.D.A. Soil Conservation Service
Post Office Box 610
Jackson, Mississippi 39205

Subject: Watershed Work Plan and Draft Environmental Statement: Okatoma Creek Watershed, Covington, Forrest, Jones, Simpson, and Smith Counties, Mississippi

Dear Mr. Heard:

The above captioned Work Plan and Draft EIS has been circulated among appropriate agencies of the State of Mississippi. Written responses are attached for your records.

No objections were brought out by this State agency review as to the need for the project. However, the State Board of Health has indicated by their response that the S.C.S. has not addressed their earlier comments of July 5, 1974, in regard to this project. Therefore, we recommend that these comments be addressed and considered in any future revision of the above captioned Work Plan and EIS. Our own inhouse comments are offered as suggestions and corrections to be considered by your agency.

Sincerely,

MISSISSIPPI BOARD OF WATER COMMISSIONERS

Jack W. Pepper
State Water Engineer

JWP:mmb
Attachs.

State of Mississippi

BOARD OF WATER COMMISSIONERS
416 NORTH STATE STREET
JACKSON, MISSISSIPPI 39201
354-7236

January 24, 1975

MBOWC MEMORANDUM

TO: Board of Water Commissioners

FROM: John E. Brown

SUBJECT: Watershed Work Plan and Draft Environmental Statement: Okatoma Creek Watershed, Covington, Forrest, Jones, Simpson, and Smith Counties, Mississippi

I have completed my review of the above captioned Work Plan and Draft EIS and would like to submit the following comments:

1. Page 6, Para. 2 of Work Plan and Page 21, Para. 1 of EIS.

   Although groundwater obtained from the deeper aquifers in the study area may be of limited value for use as irrigation water because of excessive levels of sodium, there are indications of adequate supplies of acceptable quality groundwater occurring in shallower aquifers.

2. Page 47, Para. 5 of EIS:

   Data from the Executive Summary of the Mississippi Statewide Comprehensive Outdoor Recreation Plan for 1973 reflect a need in the study area for practically all forms of outdoor recreation in the next 15-20 years. Incentives could possibly be provided to

encourage the use of potential recreational resources stemming from the construction of various flood retarding structures within the Okatoma Creek Watershed.

3. Addendum: Oct. 1974.

The total beneficial effects under the selected alternative (NED) should be $798,000. Also, under the same account, the net beneficial effects should be $300,000.

MISSISSIPPI
STATE BOARD OF HEALTH
2423 NORTH STATE STREET, P. O. BOX 1700
JACKSON, MISSISSIPPI 39205

OBB, M.D., M P H
ALTH OFFICER

December 11, 1974

Mr. John E. Brown
Mississippi Board of Water Commissioners
416 North State Street
Jackson, Mississippi 39201

Dear Mr. Brown: Re: Watershed Work Plan and Draft Environmental Statement: Okatoma Creek Watershed, Covington, Forrest, Jones, Simpson, and Smith Counties, Mississippi

We have received your memorandum of December 3 and the accompanying copies of the above documents. We have reviewed this material and find it to be essentially the same as copies which we have previously reviewed. Therefore, we would like to refer you to my letter of July 5, 1974 to Mr. James I. Palmer, Jr., a copy of which is enclosed.

If you or any of the other agencies involved have a further question concerning the matter, please let me know.

Very truly yours,

B. R. Redding

B. R. Redding, P. E.
Assistant Chief
Bureau of Environmental Health

BRR/jw

Enclosure

July 5, 1974

Mr. James I. Palmer, Jr.
Director of Resource Planning
Mississippi Board of Water Commissioners
416 North State Street
Jackson, Mississippi 39201

Dear Mr. Palmer: Watershed Work Plan and Draft Environmental Statement: Chatama Creek Watershed, Covington, Forrest, Jones, Simpson, and Smith Counties, Mississippi

We have reviewed the two above-mentioned documents and would like to make the following comments:

1. We are particularly interested in the proposed two areas which are to be used for public recreation. We understand that water contact sports are to be involved with Multiple Purpose Structure No. 1. Before this lake is constructed, we believe that a watershed study should be made to determine if there are any sources of domestic or agricultural pollution in the watershed which might cause the water to be unsatisfactory for contact sports.

2. Plans and specifications for any public water supply facilities should be reviewed and approved by the Mississippi State Board of Health before construction is begun.

3. Since septic tanks and underground absorption fields cannot generally serve public recreation areas, plans and specifications for the needed sewerage facilities should be reviewed and approved by the Mississippi Air and Water Pollution Control Commission before construction is begun.

4. Plans and specifications for the recreation area facilities should also be reviewed by the Mississippi State Board of Health to determine that they are properly designed for use by the physically handicapped with a minimum of difficulty.

5. Where water contact sports are planned for a body of water, we believe that the Board of Supervisors in the applicable county or counties should be requested to adopt appropriate subdivision regulations, health [illegible] regulations, and zoning ordinances to prevent development on privately owned land in the watershed which might cause degradation of the quality of the water.

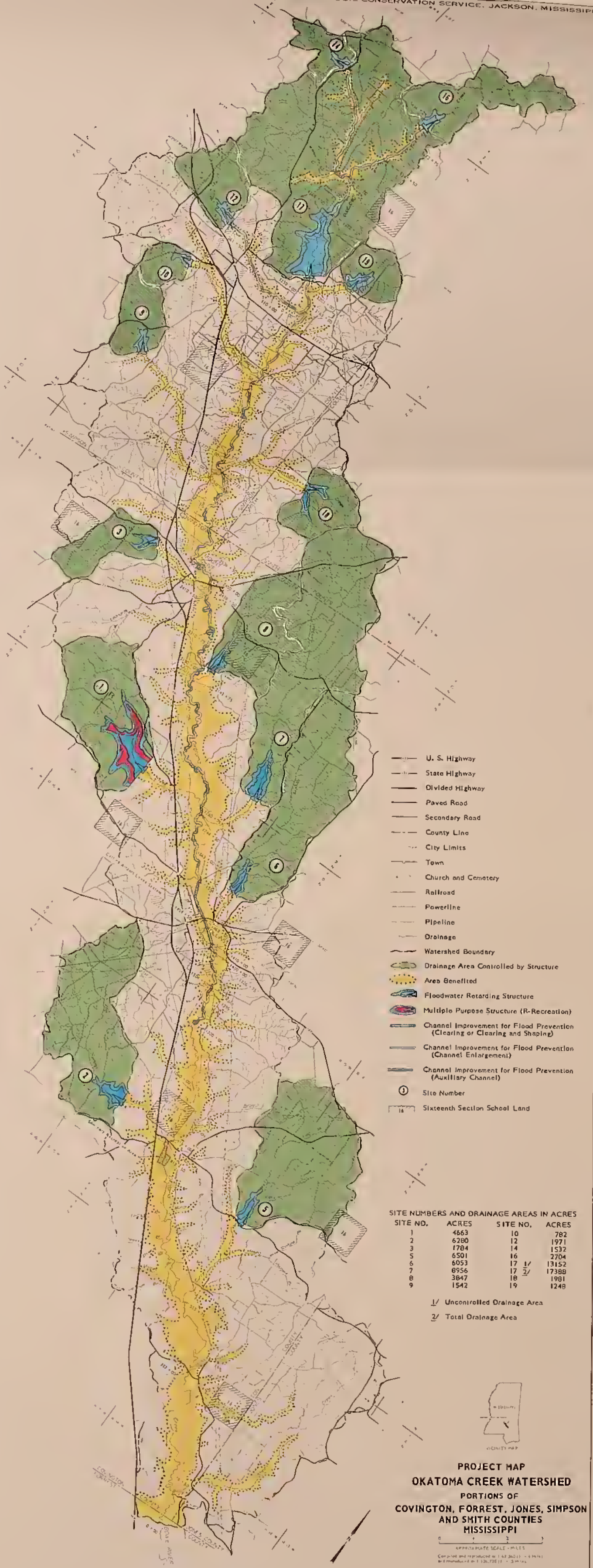
[illegible] Inc.
[illegible] E. Pelham, Jr.
[illegible]

If you or any of the other [illegible] involved have a question concerning these comments, please let us know.

Very truly yours,

B. R. [illegible], P. E.
Assistant Engineer

LR/mb



SITE NUMBERS AND DRAINAGE AREAS IN ACRES

SITE NO.	ACRES	SITE NO.	ACRES
1	4663	10	782
2	6280	12	1971
3	1784	14	1532
5	6501	16	2704
6	6053	17 1/	13152
7	8956	17 2/	17388
8	3847	18	1981
9	1542	19	1248

1/ Uncontrolled Drainage Area

2/ Total Drainage Area

VICINITY MAP

PROJECT MAP

OKATOMA CREEK WATERSHED

PORTIONS OF

COVINGTON, FORREST, JONES, SIMPSON AND SMITH COUNTIES

MISSISSIPPI

APPROXIMATE SCALE - MILES